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The Atari 51 Maximum Force logo. It features the word "ATARI" in a large, stylized font, followed by a large "51" with a small "TM" trademark symbol. Below this, the word "MAXIMUM" is written in a large, bold, sans-serif font, and "FORCE" is written in a smaller, bold, sans-serif font. The entire logo is set against a dark, textured background.

ATARI 51TM MAXIMUMTM FORCE

UNIVERSAL KIT

OPERATION MANUAL

Operation & Adjustments • Testing & Problem Diagnosis
Parts Information • Wiring Diagrams

WARNINGS & NOTICES

WARNING

USE OF NON-ATARI PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY ATARI AUTHORIZED PARTS.

* Substitute parts or modifications may void EMC directive or FCC type acceptance.

* For safety and reliability, substitute parts and modifications are not recommended. Use only ATARI authorized components and parts. Failure to do so will void warranty and may result in incorrect and/or unsafe operation.

* This game is protected by federal copyright, trademark and patent laws. Unauthorized modifications may be illegal under federal law. This also applies to ATARI logos, designs, publications and assemblies. Moreover, facsimiles of ATARI equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with ATARI components.

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MAXIMUM FORCE/ AREA 51 TM UNIVERSAL KIT

SECTION ONE

INSTALLATION

Warning

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- * For safety and reliability, substitute parts and modifications are not recommended.
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SAFETY NOTICES

The following safety instructions apply to all operators and service personnel. Specific warnings and cautions will be found throughout this manual where they apply. We recommend that you read this page before preparing your game for play.



CAUTION

HANDLING ELECTRONIC DEVICES: Observe the following precautions for handling electronic devices.

- 1) Ensure that the A.C. power to the game is turned off prior to servicing the electronics.
- 2) Discharge any static electricity build up in your body by touching a safety ground point such as the power supply chassis. This must be done **BEFORE** touching or handling the electronic assemblies.
- 3) Store the electronic assemblies in an anti-static area. Anti-static bags must be used to store the CPU board assembly. Use the same bag to save the old CPU assembly after the new unit is installed.
- 4) **DO NOT** remove or connect any electronic assemblies when the cabinet power is on. Doing so will damage the electronic assemblies and void the warranty.

DISCONNECT POWER DURING INSTALLATION OR REPAIRS. Always turn your game **OFF** and unplug it before attempting to service or install your kit. Installing or repairing PC boards with power **ON** can damage components and void the warranty. Be sure that all ground wires are installed securely.

PROPERLY GROUND THE GAME. To avoid electrical shocks, do not plug in the game until it has been inspected and properly grounded. This game should only be plugged into a grounded 3-wire outlet. Do not use a "cheater" plug or cut off the ground pin on the line cord.

USE PROPER FUSE. To avoid electrical shock, all replacement fuses must match the original fuse in fuse type, voltage rating, and current rating.

SALVAGED PARTS. Parts salvaged from old games are required to complete your kit. These salvaged parts must operate perfectly; otherwise, the converted game cannot perform properly or safely. Always repair circuit board malfunctions and cabinet damage before conversion is attempted.

POWER SUPPLY. Be sure the power supply from your old game is capable of +5Vdc at 5A, -5Vdc at 1A, and +12Vdc at 3A. All power supply voltages are $\pm 5\%$ under load. These operating voltages are necessary for the kit. Your power supply must be FCC approved.

WIRING. This kit uses as much of the existing wiring as possible. To avoid errors in operation, verify that the wiring is an exact match with the diagrams after the conversion is completed.

SPEAKERS. This kit is intended for stereo full-range speaker systems handling at least 10 WATTS.

MONITOR. This kit is not intended for use with X-Y monitors. Suitable monitors have horizontally mounted CRTs and raster electronics with inputs for RGB video and COMPOSITE NEGATIVE SYNC.

COIN MECHANISMS. Be sure to clean and test your game coin mechanisms with known currency. Servicing of these mechanisms is crucial to your game's earning potential and operation.

COIN METERS. Coin meters are not provided with this kit. Wiring information is provided as a convenience to the operator. Existing meters may be used provided their operation is verified.

HANDLE FLUORESCENT TUBE AND CRT WITH CARE. If you drop a fluorescent tube or a CRT and it breaks, it will implode! Shattered glass can fly eight feet or more from the implosion.

HARD DISK DRIVE. The hard disk drive must be packed in an anti-static bag. The disk drive assembly must be removed from the tray and packed in an approved shipping container (P/N 08-8068) in order to be sent in for repair or replacement. Do not stack or drop hard disk drives during installation or removal.

PRODUCT SPECIFICATIONS

Player Variables

1 or 2 players per game
High Score Recognition

Operator Variables

Coinage, Game Options,
Difficulty, Volume, Audits,
Statistics

Diagnostics

Automatic Power-Up Self-Test
Manual Multi-Level Menu System

CABINET SAFETY REQUIREMENTS

For safe use of this game, install this kit into a standard Atari Games Corporation "family" cabinet, or into any universal game cabinet that is listed by Underwriters Laboratories.

NOTICE - FCC COMPLIANCE

INSTALLATION OF THIS KIT INTO ANY EXISTING PRODUCT DOES NOT
GUARANTEE COMPLIANCE WITH FCC REQUIREMENTS. YOU ARE SOLELY
RESPONSIBLE FOR FCC COMPLIANCE FOR INSTALLATIONS IN OTHER
PRODUCTS. ANY EXISTING FCC COMPLIANCE STICKER MUST BE
REMOVED AND A NEW STICKER SHOULD NOT BE INSTALLED ON THE
CONVERTED PRODUCT UNTIL YOU HAVE VERIFIED FCC COMPLIANCE.

EPILEPSY WARNING

A very small portion of the population has a condition which may cause them to experience epileptic seizures or have momentary loss of consciousness when viewing certain kinds of flashing lights or patterns that are present in our daily environment. These persons may experience seizures while watching some kinds of television pictures or playing certain video games. People who have not had any previous seizures may nonetheless have an undetected epileptic condition.

If you or anyone in your family has experienced symptoms linked to an epileptic condition (e.g. seizures or loss of awareness), immediately consult your physician before using any video games.

We recommend that parents observe their children while they play video games. If you or your child experience the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation, or convulsions, DISCONTINUE USE IMMEDIATELY and consult your physician.

ATTENTION

PROPERLY ATTACH ALL CONNECTORS. Be sure that the connectors on each printed circuit board (PCB) are properly connected. If they do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty. All connectors are keyed to fit specific pins on each board.

INSPECTION

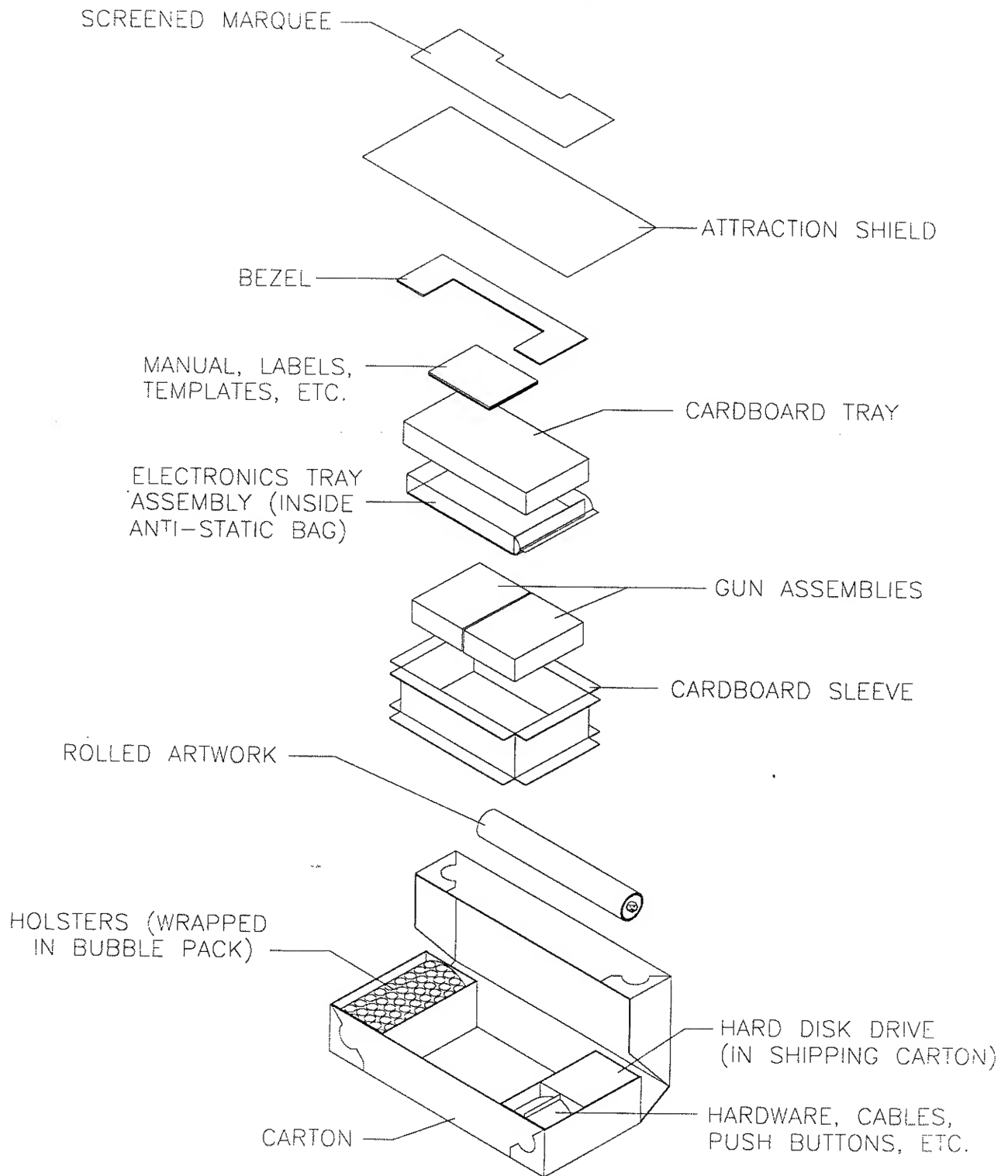
Unpack the materials from the carton and inspect for obvious signs of damage. Use this checklist to be sure the kit is complete. You must supply the remainder of the materials required for this conversion.

Part Number	Item	Quantity	Function
[] A-21629	CPU Board Assembly	1	(shipped on electronics tray assembly)
[] A-22095	Hard Disk Drive Assembly	1	(game program and graphic images)
[] A-22142	Electronics Tray Assembly	1	(mounting tray for game electronics)
[] H-21672	Braided Ground Wire Assembly	2	(prevents static charges from guns)
[] H-21894	Ground Wire Assembly	1	(connects electronics tray to ground)
[] H-21895	Audio Cable Assembly	1	(connects amplifiers to speakers)
[] H-21896	Gun Wiring Cable Assembly	2	(gun electronics to system CPU Board)
[] 03-9663	Attraction Shield	1	(clear plastic cover for marquee)
[] 03-9664	Control Panel Cover	1	(to protect control panel surface)
[] 04-10682.2	Maximum Force Gun Assembly	2	(player 1 and 2 optical gun with cable)
[] 04-11068	Point of Purchase Kit	1	(to announce game to players)
[] 08-8067	Universal 25" Monitor Bezel	1	(to cover monitor mounting brackets)
[] 08-8068	Hard Disk Drive Shipping Container	1	(to protect hard disk drive during transit)
[] 16-8587-825	FBI Warning Label	1	(federal game protection warning)
[] 16-9922.1	Epilepsy Warning Label	1	(alerts players to epilepsy possibility)
[] 16-10077	Electronic Device Caution Sheet	1	(suggestions to avoid damaging parts)
[] 16-10139	FCC / Canada Warning Label	1	(suggestions to avoid interference)
[] 16-10397-1	Control Panel Template	1	(to mark new player control hole layout)
[] 16-10397-2	Gun Mount Template	2	(to mark new gun mount hole layout)
[] 16-34032-101	Maximum Force/Area 51 Kit Manual	1	(installation, operation, troubleshooting)
[] 20-9642	T-10 Tamper-Resistant Wrench	1	(fits tamper-resistant screws on guns)
[] 20-10209-3	Long Shaft Pushbutton (Blue)	1	(player 1 game start/continue controls)
[] 20-10209-5	Long Shaft Pushbutton (Yellow)	1	(player 2 game start/continue controls)
[] 31-2937-2	Lighted Marquee Artwork	1	(identifies game cabinet to players)
[] 31-2938	Bezel Game Instruction Decal	1	(to explain game rules and instructions)
[] 31-2939	Control Panel Side Decal	2	(to cover existing cabinet markings)
[] 31-2940	Control Panel Wallpaper Decal	1	(to cover existing panel markings)
[] 31-2942	Promotional Poster	1	(to announce game to players)
[] 4006-01005-04	6-32 x .25" Machine Screw	4	(to attach disk drive to electronics tray)
[] 4110-01088-12	#10 x .75" Sheet Metal Screw	4	(to attach electronics tray to cabinet)
[] 4310-01123-16B	10-24 x 1.0" Carriage Bolt (Black)	6	(to mount clear cover onto control panel)
[] 4310-01123-36B	10-24 x 2-1/4 Carriage Bolt (Black)	6	(to attach gun mounts to cabinet front)
[] 4408-01128-00	8-32 KEPS Hex Nut	1	(to fasten ground wire to electronics tray)
[] 4410-01119-00	10-24 ESN Hex Nut	12	(to fasten gun mounts and holsters)
[] 4410-01128-00	10-24 KEPS Hex Nut	6	(to fasten clear cover onto control panel)
[] 4700-00020-00	#8 x .375" Flat Washer	1	(to fasten ground wire to electronics tray)
[] 4700-00023-00	#10 x .625" Flat Washer	18	(to fasten gun mounts and holsters)
[] 4700-00076-00	#6 x .312" Flat Washer	4	(to fasten disk drive to electronics tray)
[] 4703-00007-00	#6 x .25" External Tooth Lockwasher	4	(to fasten disk drive to electronics tray)
[] 5556-13956-00	2 Piece 1.25" Square Ferrite Bead	2	(controls radio frequency interference)
[] 5556-13957-00	2 Piece .75" Square Ferrite Bead	1	(controls radio frequency interference)
[] 178398-001	Gun Holster Assembly	2	(holds gun on cabinet when not in use)

Recommended tools and supplies

[] black semi-gloss paint	[] black electrical tape
[] electric drill and wood drill bit set	[] hole saw or equivalent
[] screwdrivers	[] safety utility knife
[] liquid soap (dishwashing detergent)	[] squeegee or soft sponge
[] grease pencil or marker	[] soldering iron and solder
[] nut drivers or socket wrench set	[] pliers or wire cutters
[] wood filler material (putty, glue, board, etc.)	[] 180 grit sandpaper or electric sander

KIT PACKAGING

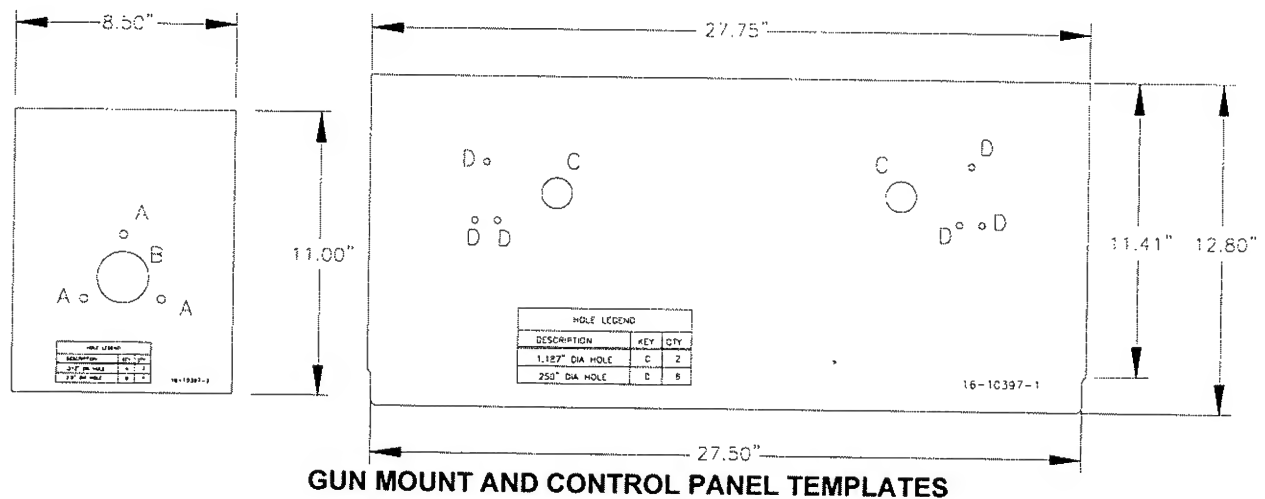


CONVERTING A TYPICAL VIDEO GAME CABINET

CABINET MODIFICATIONS

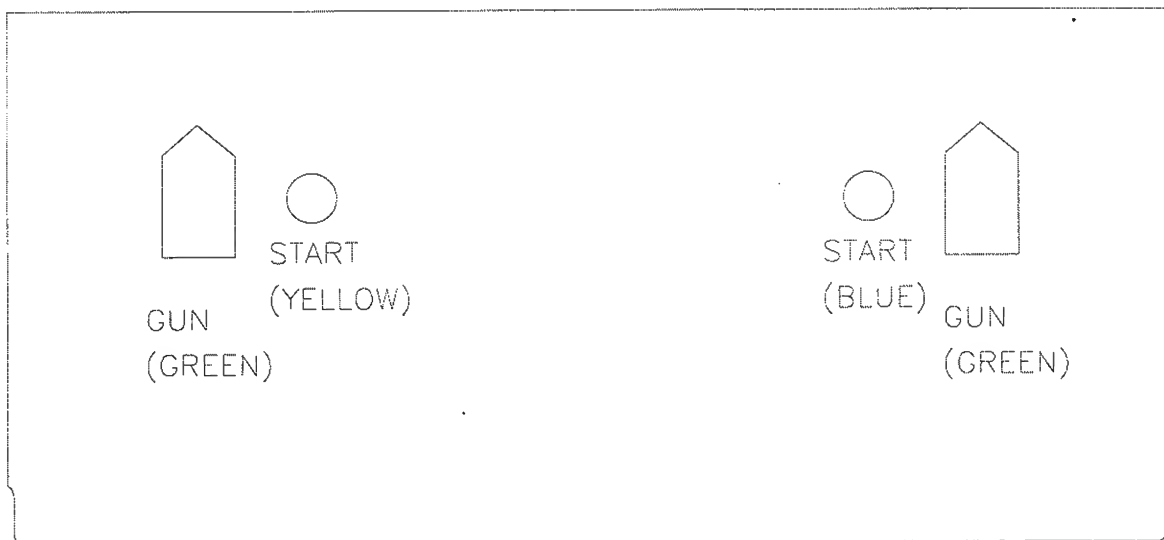
1. Verify the operation of the existing game before making any changes to the cabinet. Pay special attention to those components that will be used again after conversion is completed (Power Supply, Video Monitor, Currency Acceptors, Wiring Harnesses, Cabinet Locks, Speakers, Fluorescent Lamp, Cooling Fans, Mounting Brackets, etc.). Repair or replace damaged parts before installing the kit.
2. Switch off power to the game. Disconnect the line cord from the A.C. power. Clear the work area. Cover or protect the non-wood items (marquee, monitor, coin door, brackets, line cord, etc.).
3. For cabinets with decorated sides, note the location of decals or artwork and remove them. Clean off all glue residue. Fill gouges, unused holes, etc with quick-hardening wood putty or other suitable filler material. Sand the cabinet smooth and remove all dust.
4. Evenly cover the entire cabinet with black paint. Allow the paint to dry completely before continuing.
5. Pencil a line roughly at the top of the previous graphic. Lightly moisten the cabinet with soapy water. Remove the backing and apply the decal. Start at the top and work down. After the decal is in place, smooth it outwards, taking care to squeeze out air bubbles. If you can not remove an air bubble, pop it with a knife or pin and smooth it down. Allow at least 12 hours for the adhesive in the decal to set.
6. Remove the existing attraction shield and marquee from the game cabinet. Check the lamp and install a new one if cracks or darkened ends are found, even if it still lights at the time of inspection. Install the new kit marquee. Using the previous shield as a guide, trim the new attraction shield to size and debur the edges. Clean the new marquee attraction shield before installing it in the game.
7. Remove the viewing glass and set it in a safe place. Remove the original monitor bezel. Clean the CRT glass. Trim the new monitor bezel as required to fill the area between the CRT and the cabinet. Apply the player moves and the game play instruction decals to the top and bottom of the new monitor bezel. Place the Epilepsy Warning label on the front of the monitor bezel. Be sure that decals and labels do not obstruct the viewing area. Clean bezel and viewing glass before installing in the game.
8. If this kit is installed in a 25" ATARI universal family video cabinet, the FCC compliance label (16-10139) supplied may be placed on the rear of the cabinet after other existing labels have been removed. The FCC label must not be placed on converted product until all grounds and ferrite beads have been installed exactly as instructed and compliance has been verified by FCC tests. ***Installation of this kit into any other product does not guarantee FCC requirement compliance.***
9. Remove and save the screws at the top and sides of the rear door. Unlock the rear door, then lift it off of the cabinet and set it aside. Use a vacuum cleaner to remove any dirt or debris inside the cabinet.
10. Locate the control panel latches or fasteners and free the control panel from its operating position. If there is no wiring harness connector, label each of the wires before disconnecting them from the Player Controls. Once the wires are disconnected, remove the control panel from the game cabinet. Save the mounting brackets and hardware for reinstallation after the control panel has been modified.
11. Some cabinets have speakers located on the control panel or other removable pieces of the cabinet. If speaker harnesses must be disconnected, be certain to mark polarity of wires as well as function. Incorrectly phased speakers can cause weak low frequencies or a thin, hollow sound quality.

CONTROL PANEL MODIFICATIONS



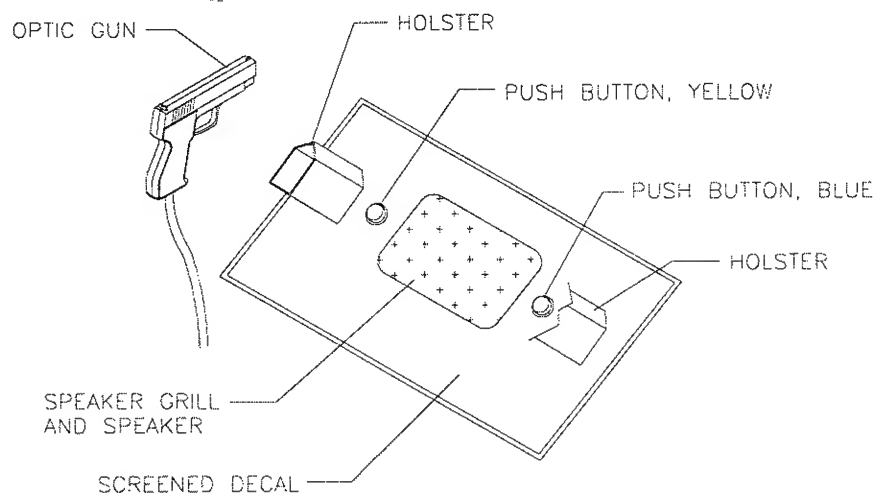
GUN MOUNT AND CONTROL PANEL TEMPLATES

1. Locate control panel template and gun mount template (refer to illustration above). Stack books, newspapers, magazines, etc., on the templates until needed (this flattens them sufficiently for use).
2. Remove the control panel buttons and joysticks from the existing control panel. Remove the panel covering and any artwork from the previous game. Remove any hinges or mounting brackets.
3. Fill the existing control panel holes with wood, putty, glue or other suitable material. Allow adequate time for materials to dry, then sand or file the control panel to a flat surface on both sides.
4. Place the gun mount templates on the cabinet front with the top edge up against the control panel bottom. The inside edge of the templates should be 3.0" (7.6 cm) from the center line of the cabinet. Mark hole locations for left and right gun mounts. Cut and deburr the holes. Remove the templates.
5. Place the control template on top of the repaired panel. Orient it to center the controls and tape it in place. Cut and deburr all holes for the holsters and the control panel buttons. Remove the template.
6. Place the control panel face down on top of the clear plastic cover and center it. Mark the outside shape of the panel and the hole locations onto the cover. Remove the control panel and set it aside. Cut and deburr all holes for the holsters and control panel buttons. Trim the cover to panel shape.
7. Remove the backing and apply the decal to the panel. Start at the top and work down. After the decal is in place, smooth it outwards, taking care to squeeze out air bubbles. If you can not remove an air bubble, pop it with a knife or pin and smooth it down. Allow the adhesive in the decal to set.
8. Use a sharp knife to trim the edges and to cut the holes for the control panel buttons and joysticks. Position the control decals next to the appropriate hole locations. Allow the decal adhesive to set.
9. Install the plastic cover over the decals and the panel. Attach the cover and debur the edges.
10. Group Player Controls by color: The Player 1 pushbutton is yellow. The Player 2 pushbutton is blue. The pushbuttons must be disassembled for panel mounting.
11. Separate a switch from its push-button. Bend the large prong away from the switch just enough to slide the switch off of the housing. Unscrew the nut from the housing. Insert the push-button housing through a switch hole from the front side of the control panel. Screw the nut finger-tight onto the switch housing from the back of the panel. Snap the switch back onto the housing.



CONTROL LOCATIONS

12. Repeat this step for each button of the same color. Continue until all pushbuttons are mounted.
13. Rotate the pushbuttons so that the switch terminals are properly oriented and tighten the nuts firmly.
14. Locate a gun holster. Align the mounting studs with the control panel holes and press to seat fully. Install a flat washer and a nut on each stud and tighten securely. Repeat steps for the other holster.
15. Lay the control panel on top of the cabinet where it will be installed but do not attach it at this time. Locate the guns and insert each into a holster. Straighten the cables and let them hang down freely.
16. Insert the gun mount cable connector into the large gun mount hole. Orient the triangular plate with the flattened corner up and install the carriage bolts. Align the bolts with the small mounting holes and press to seat fully. Install a flat washer and a nut on each bolt and tighten securely. Repeat steps for the other gun mount. Check each gun hose assembly for freedom of movement in all directions.
17. The completed control panel should now resemble the illustration below. Install the modified control panel onto the modified cabinet using the existing mounting hardware. Tighten all fasteners firmly.



TYPICAL COMPLETED CONTROL PANEL

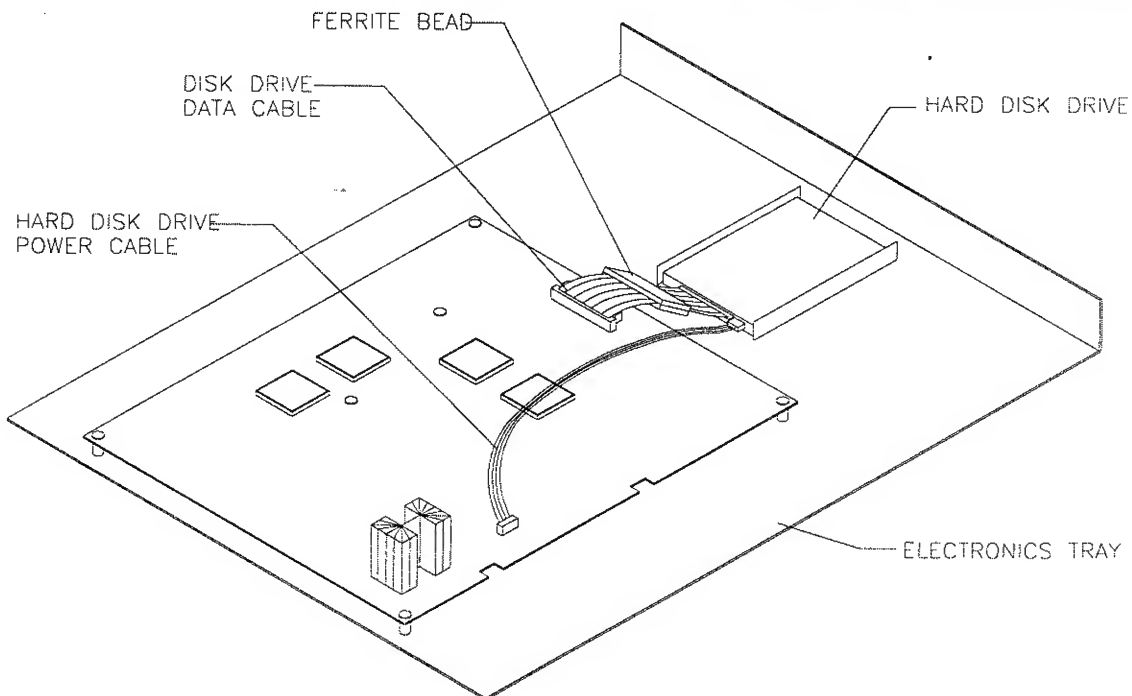
GAME ELECTRONICS TRAY COMPONENTS

The CPU Board Assembly electronic components are static sensitive. Prepare an anti-static work area and ground yourself before removing the CPU Board from its protective shipping materials.

Do not connect any cable to the CPU Board Assembly or Power Supply with the power turned on. Doing so while the power is turned on may damage the game and void your warranty.

CAUTION: HARD DISK DRIVES ARE FRAGILE. Do not stack or drop Hard Disk Drive Assemblies.

1. Be certain that the power is switched off and the cord is disconnected from the A.C. line voltage. Carefully disconnect the cables on each printed circuit board in the game. Remove the existing printed circuit board set and the disk drive (if present) and set aside. Anti-static bags and protective containers from the new components may be used to store these items after conversion is complete.
2. Remove the Electronics Tray Assembly from its packaging and place it on a flat work surface. Locate the Hard Disk Drive Power Cable (separate wires with four-pin plastic connectors at each end). Attach the power cable to CPU connector HDPOWER (near the large heatsink). Mate the connectors and press firmly to seat the contacts fully. *The connector is keyed. Do not use excessive force.*
3. Remove the Hard Disk Drive Assembly from its package. Locate the data and power connectors on the Hard Disk Drive. Orient the Disk Drive with connectors toward the CPU Board and place it into the mounting brackets on the tray. Align screw holes and install flat washers, lockwashers, and screws.
4. Connect the remaining end of the Hard Disk Drive Power Cable to the connector on the disk drive. Mate the connectors and press firmly to seat the contacts fully. *Do not use excessive force.*
5. Locate the free end of the Hard Disk Drive Data Cable (flat ribbon with stripe on one side). This cable is already attached to the CPU Board Hard Disk Drive Connector. Orient this cable with the striped edge closest to the power cable. Attach the cable to the drive data connector. Mate the connectors and press firmly to seat the contacts fully. *This connector is keyed. Do not use excessive force.*



MOUNTING COMPONENTS ON ELECTRONICS TRAY

CABINET WIRING

NOTE: The operator must install a JAMMA wiring harness, or use the JAMMA cable from the existing game. Inspect existing cabinet wiring and compare with the Recommended Cabinet Wiring Diagram (Section Three). Most games already have JAMMA wiring which is compatible with the conversion kit. If the connectors in your cabinet do not fit onto the CPU Board or the wire colors do not match the JAMMA Chart, contact your authorized distributor for assistance with this problem.

CAUTION

Properly insulate any unused wires within the JAMMA cable, especially red, yellow, orange and black power wires. Secure any unused connectors away from the CPU Board.

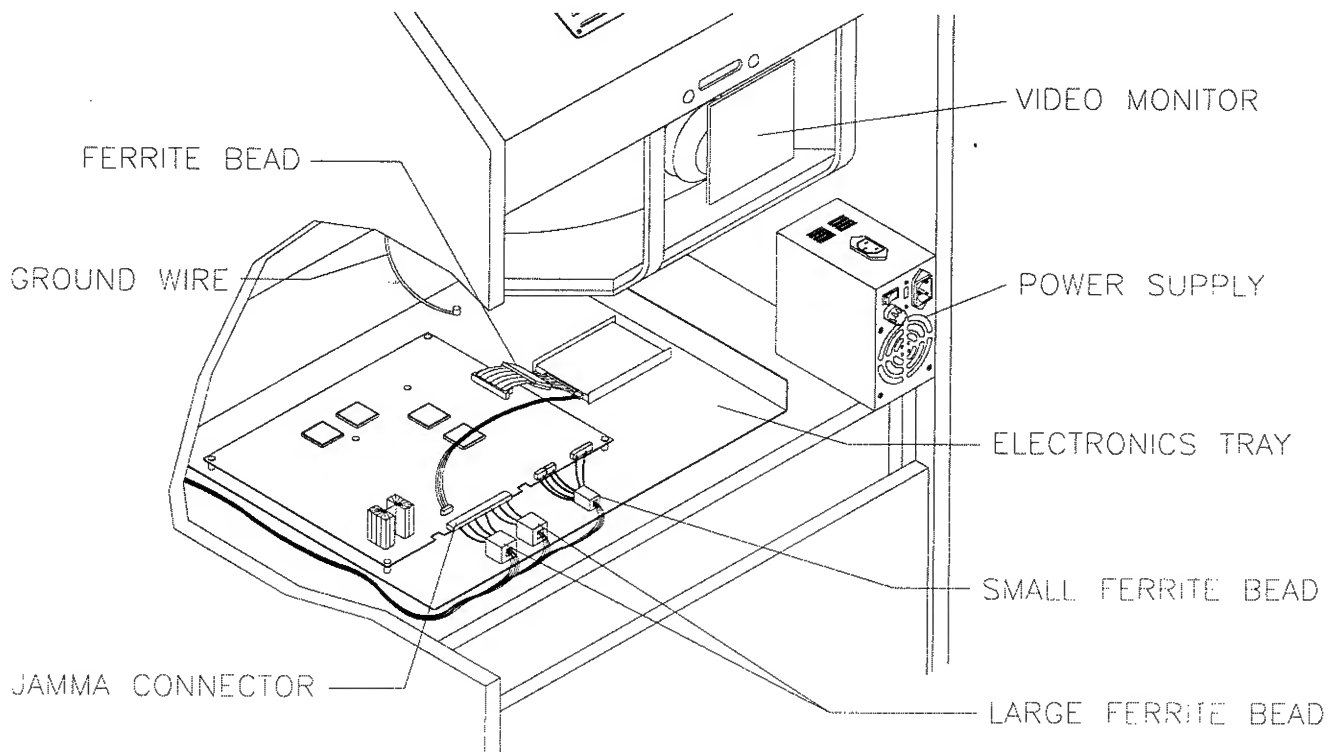
1. Locate the braided ground wires H-21672 with the kit. Remove one nut on each of the gun mounts inside the cabinet. Attach one end of each ground wire to the gun mount and reinstall the nuts. Attach the free ends of the ground wires to a convenient common ground point in the cabinet. Verify low resistance continuity between the two gun mounts and the ground pin in the cabinet line cord.

NOTE: *This ground connection prevents static charges from interfering with proper gun operation.*

2. Locate the gun harness cables H-21896. Mate one harness with the connector from player 1 (left) gun, then route the cable away from the existing wiring in the cabinet. Mate the remaining connector with CPU Board jack JGUN1. Repeat the process to connect the other cable to player 2 (right) gun and CPU jack JGUN2. Secure the cables to the cabinet using your own cable clamps and screws.
3. Locate the START 1 and START 2 wires from the JAMMA cable (refer to the JAMMA Chart and the Cabinet Wiring Diagram in Section Three). Connect these wires to the control panel blue and yellow START pushbuttons. Insulate and secure any unused wires away from the switch terminals. Verify continuity between the START switches and the JAMMA connector.
4. Cabinets without complex speaker systems may be wired directly to the JAMMA Connector harness. You may choose stereo (two separate audio channels) or mono (both channels wired in parallel). Connect these wires to the speaker terminals (refer to Cabinet Wiring Diagram for assistance).
5. Audio harness cable H-21895 is an adapter designed for cabinets with separate treble speakers (such as ATARI's Lethal Enforcer game). Use this cable for complex speakers. Mate the larger cable connector with CPU Board jack JSPKR and the smaller connector with the existing audio cable. Cabinets with a single large speaker or subwoofer will require additional wiring from pins 10 and 11 of the connector to this speaker. Refer to the Cabinet Wiring Diagram (Section Three) for wire colors and speaker polarities. Secure the cable to the cabinet using your own cable clamps and screws.
6. If your cabinet does not have service switches in the coin door area, you may wish to add them at this time (this speeds up routine service calls). Most new game electronics can accommodate signals for service credits, test modes, and volume changes. Wire colors, connector pin assignments, and sample wiring diagrams for these momentary switches are found in Section Three of this manual.
7. Connect any ground wires loosened or removed in previous steps (control panel, coin door, etc.).
8. Place the FBI Warning Label next to the CPU Board. Be certain the label is completely visible.

FINAL ASSEMBLY

1. Place the completed Electronics Tray in the cabinet where the previous electronics were located. Locate the JAMMA edge connector on the CPU Board (on the side near the heatsink). Orient the tray so that the JAMMA contact area on the CPU board is next to the JAMMA connector on the harness. The disk drive must be as close to the cabinet floor as possible if the tray must be vertical (i.e., wall mounting). Ensure that there will be adequate space nearby for the cooling fan if there is one already in the cabinet. Use the tray itself as a template to mark mounting hole locations.
2. Locate the #10 x .75" sheet metal screws from the kit. If necessary, drill pilot holes for screws. Install a screw in every mounting hole and secure the Electronics Tray to the cabinet. Tighten screws firmly.
3. Electrical codes require conductive assemblies to be grounded for safe product operation. Locate the central power ground point for the cabinet (ground wires are usually green; some may have a yellow stripe). Connect a short, heavy gauge ground wire from the tray to the central power ground.
4. Locate the square split ferrite beads. Separate the wires in the main harness into two bundles where they attach to the JAMMA connector. Install one large ferrite bead around the D.C. power conductors (solid color heavy gauge wires with pin numbers 1-6 or A-F). Install the other large bead around the control panel conductors (striped color lighter gauge wires). Install the small ferrite bead around the gun harness cable wires. Place the beads as close to the JAMMA connector as possible, then close and lock each one. Ensure that no wires are pinched or caught in the latches.
5. Attach the JAMMA Connector to the CPU Board. Mate the connectors and press firmly to seat fully. *The connector is keyed. Do not use excessive force.* Fold unused wiring back away from the board. The illustration shows a typical electronics tray installation in an ATARI family series cabinet.



TYPICAL CPU BOARD AND HARD DISK DRIVE ORIENTATION

INITIAL POWER UP

1. Plug the line cord into a source of A.C. power and turn it on. CPU Board indicators should illuminate.
2. The game will load the program and begin self-diagnostics. If no errors are found, the game will automatically enter its "attract" mode. Check wiring and refer to Troubleshooting (Section Four) if problems occur.
3. Unlock and open the coin door. Press and hold the TEST button until the menu system appears on the screen. Select CONTROLS TEST and verify that each switch and control operates properly. Use other tests to verify coin mechanisms, disk drive, etc. Refer to Operation (Section Two) for test steps.
4. Return to the SELECT TEST menu screen. Choose GUN TEST to check gun performance (refer to Operation for details). It is expected that the gun aim will not be completely accurate at this time.
5. From the SELECT TEST menu, select CALIBRATION to reset the alignment of each gun. Stand directly behind the gun holder and extend the cable to its full length to ensure the greatest accuracy.
6. Return to the GUN TEST to verify that each gun is aimed correctly. Precise aim is important to game play. Repeat the calibration and test cycle as many times as necessary to optimize gun performance.
7. From the SELECT TEST menu, choose MONITOR TESTS to confirm proper video display operation. If the monitor remote adjustment controls do not permit satisfactory picture quality to be obtained, the monitor may not be matched correctly to the video circuits on the CPU Board. Jumpers are included on the board to optimize the video impedance. Refer to Operation (Section Two) for test steps, Wiring (Section Three) for jumper locations and recommended settings, or Troubleshooting (Section Four).
8. From the SELECT TEST menu, select EXIT TEST MENU to begin normal game operation. Open the coin door and press the SERVICE CREDITS button to allow game play. Choose a gun and press the START button to begin. Listen to the audio while playing the game. Note unexpected irregularities in sound (out of phase, no low frequencies, mono signals from stereo speakers, etc.). Check the wiring harness for internal shorts or strapped connections. Jumpers are included on the CPU Board to optimize the audio configuration for the quantity and type of speakers. Refer to Wiring (Section Three) for jumper locations and recommended settings, or Troubleshooting (Section Four).
9. Close and lock the coin door. Replace the rear cabinet door. Allow the system to operate for several hours before attempting any game changes. Refer to Operation (Section Two) for adjustment steps.
10. When proper operation is confirmed, the game may be tested for FCC or other agency approval.

YOU ARE SOLELY RESPONSIBLE, AND ATARI WILL HAVE NO RESPONSIBILITY FOR FCC COMPLIANCE FOR INSTALLATIONS IN PRODUCTS OTHER THAN A 25" ATARI UNIVERSAL FAMILY VIDEO CABINET). THE FCC COMPLIANCE STICKER SUPPLIED MUST NOT BE INSTALLED ON THE CONVERTED PRODUCT UNTIL FCC COMPLIANCE IS VERIFIED.

MAXIMUM FORCE/ AREA 51™ UNIVERSAL KIT

SECTION TWO

OPERATION

NOTICE

Information in this manual is subject to change without notice. ATARI reserves the right to make improvements in equipment function, design, or components as progress in engineering or manufacturing methods may warrant.

Fill out and mail in the Game Registration card. Be sure to include the game serial number from the label on the rear of the cabinet. For your records, write the game serial number in the manual. SERIAL NUMBER _____

SAFETY NOTICES

The following safety instructions apply to all game operators and service personnel. Specific warnings and cautions will be found throughout this manual where they apply. We recommend that you read this page before preparing your game for play.



CAUTION

HARD DISK DRIVE. The hard disk drive must be packed in an anti-static bag. The disk drive assembly must be packed in an approved shipping container (P/N 08-8068) in order to be sent in for repair or replacement. Do not stack or drop hard disk drives during installation or removal.

TRANSPORTING GAME: This game contains glass and fragile electronic devices. Transport this game securely. Avoid rough handling. Do not move this game with power on.

AC POWER CONNECTION. Verify that the switch on the power supply is set for 110VAC or 220VAC according to local line voltage. Verify that the fluorescent lamp assembly is correct for local line voltage.

PROPERLY GROUND THE GAME. To avoid electrical shocks, do not plug in the game until it has been inspected and properly grounded. This game should only be plugged into a grounded 3-wire outlet. Do not use a "cheater" plug or cut off the ground pin on the line cord.

POTENTIAL SHOCK HAZARD. This video game system does not utilize an isolation transformer. No isolation exists between the internal cabinet AC system and the external AC line.

DISCONNECT POWER DURING REPAIRS. To avoid electrical shock, turn off the power switch and disconnect the game from the AC power source before removing or repairing any part of the game. After servicing any parts of the unit, be sure that all of the ground wires are secure before restoring power.

USE PROPER FUSE. To avoid electrical shock, all replacement fuses must match the original fuse in fuse type, voltage rating, and current rating.

PROPERLY ATTACH ALL CONNECTORS. Be sure that the connectors on each printed circuit board (PCB) are properly connected. If they do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty. Connectors are keyed to fit specific pins on each board.

HANDLE FLUORESCENT TUBE AND CRT WITH CARE. If you drop a fluorescent tube or CRT and it breaks, it will implode! Shattered glass can fly eight feet or more from the implosion.

EPILEPSY WARNING

A very small portion of the population has a condition which may cause them to experience epileptic seizures or have momentary loss of consciousness when viewing certain kinds of flashing lights or patterns that are present in our daily environment. These persons may experience seizures while watching some kinds of television pictures or playing certain video games. People who have not had any previous seizures may nonetheless have an undetected epileptic condition.

If you or anyone in your family has experienced symptoms linked to an epileptic condition (e.g., seizures or loss of awareness), immediately consult your physician before using any video games.

We recommend that parents observe their children while they play video games. If you or your child experience the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation, or convulsions, DISCONTINUE USE IMMEDIATELY and consult your physician.

GAME OPERATION

STARTING UP

Each time the game is first turned on or power is restored, it begins executing code out of the boot ROM. These self-diagnostic tests automatically verify and report condition of the hardware and the disk drive. The screen is blank during these tests. If any of the individual tests fails, then an error message will be displayed for each test. The message will be displayed for 30 seconds or until any button is pressed.

- * If no buttons are pressed, the system will quickly complete all tests then load and run the game.
- * Press and hold the coin door TEST button to skip the boot ROM tests and activate the Menu System.

Once all Power-up tests have been passed, the game goes into its "attract mode". Scenes and sounds from typical games are alternated with previous high scores in an endless pattern until game play starts.

GAME RULES

Play instructions are found on the monitor bezel or the lighted information panel.

INDIVIDUAL PLAY

Insert currency to start the game. Play begins after a game is chosen and a mission has been selected. The game will progress until time is exhausted. More time is rewarded as a player's accuracy increases. If no more play is required, the game automatically returns to the "attract mode".

MULTIPLE PLAYERS

Insert currency. Choose guns and press both START buttons. Select a game and a mission as above. The game will progress until time is exhausted. More time is rewarded as the players' accuracy increase. An indicator bar at the top of the screen shows which player is scoring more points during competition.

PLAYER CONTROLS

(NOTE: Use the gun to shoot through obstacles and enter secret rooms.)

♦ START Button

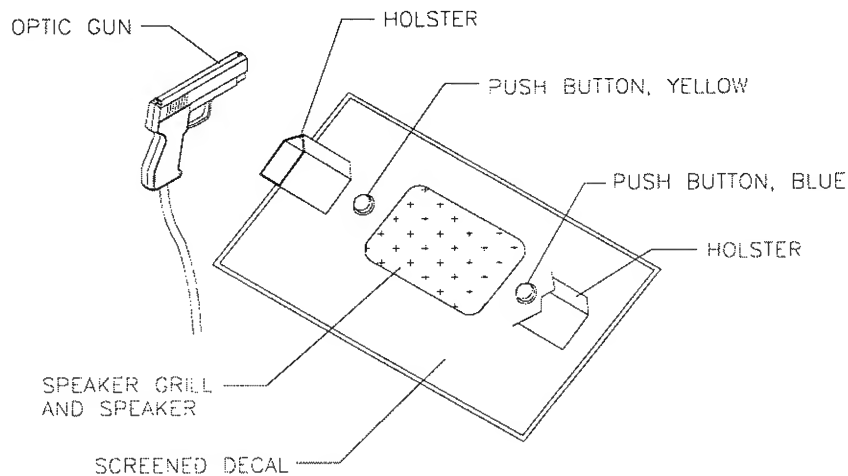
This button allows players to begin or continue play.

This same button selects items from the menu during service.

♦ GUNS

The guns are used to shoot bad guys, make holes in objects, set off explosives, etc.

The guns are used to select items from the menu during service.



TYPICAL PLAYER CONTROL LOCATIONS

OPERATOR CONTROLS

CABINET SWITCHES

- ◆ **Power Switch** (on the power supply at the rear of the cabinet)
The **Power Switch** turns off the game during service. It does not reset the game variables.
- ◆ **Monitor Remote Adjustments** (typically behind the coin door or in the cabinet near the monitor)
The **Monitor Remote Adjustment Board** sets the video display for optimum viewing.
- ◆ **Slam Tilt Switch** (on coin door) prevents cabinet abuses such as pounding to obtain free games.

CONTROL SWITCHES

- ◆ **Volume Down and Volume Up Buttons** (frequently mounted on or behind coin door in many games)
The **Volume Down** and **Volume Up** push-button switches increase or decrease game sound levels. Press either button briefly to make minor changes. Press and hold a button to make major changes.

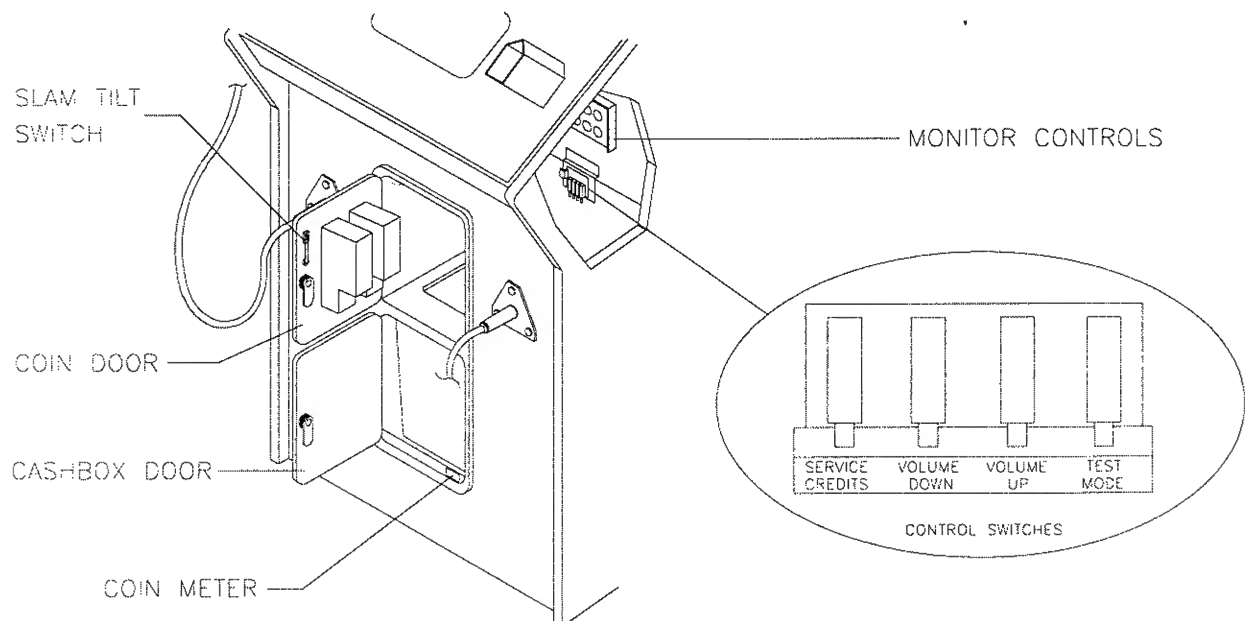
NOTE

The Attract Mode volume is controlled independently of the Game Mode volume.
For greater profits, adjust your volume levels to a loud setting to draw attention to this game.

- ◆ **Test Mode Button** (on or behind the coin door; CPU Board switch S1 performs this same function)
The **Test Mode** push-button switch enters the menu system. Press the Test Mode button briefly to run automatic tests. To make changes, press and hold Test until the system menu is displayed.
- ◆ **Service Credit Buttons** (mounted on or behind the coin door on games equipped with this switch)
The **Service Credit** push-button switch allots credits without changing the game's bookkeeping total.

These buttons may also be used instead of the guns when operating the menu system.

NOTE: The coin door must be open to reach the control switches in most games.



TYPICAL CONTROL SWITCH LOCATION

MENU SYSTEM

SYSTEM OVERVIEW

Game variables and diagnostics are presented in a series of on-screen menus. The Main Menu screen allows the operator to view information, make changes, or verify equipment operation. Each Sub Menu screen displays one specific group of choices. The Detail Menu presents data or runs the required test. You must be at the Detail Menu level to detect errors, make changes, or activate tests. Both the operator controls and the player controls are used to move through the menus and start or stop particular routines.

SCREEN LAYOUT

Each menu screen is different, but the material presented stays in the same physical location each time.

The color bar at the top center of each screen displays the current menu title.

The center of the screen is used for data (menu items, video signals, statistics, reports, etc.)

The bottom of the screen is reserved for messages (control functions, revision levels, etc.)

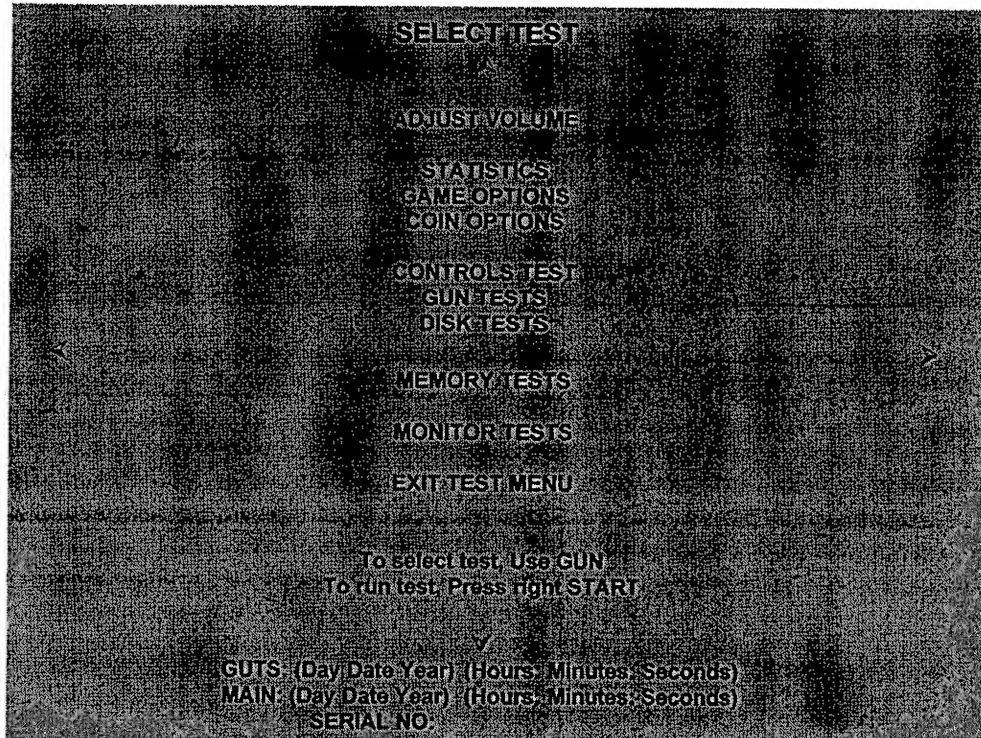
ORGANIZATION

Main Menu screen items fall into two categories: options and tests. Items must be activated manually.

Sub Menu screen items offer the operator choices within a category. Some items have no Sub Menu while others may have more than one. You can get back to the previous menu or go on to the next menu.

Detail Menu screen items contain specific information. The operator must interact with the system to get results or to make changes. There is always a way to go back to the previous menus from this screen.

Use the control indicated to highlight an item on any menu. Only one highlighted item can be selected at a time. To return the game to normal, select EXIT TO GAME, then press the indicated button.

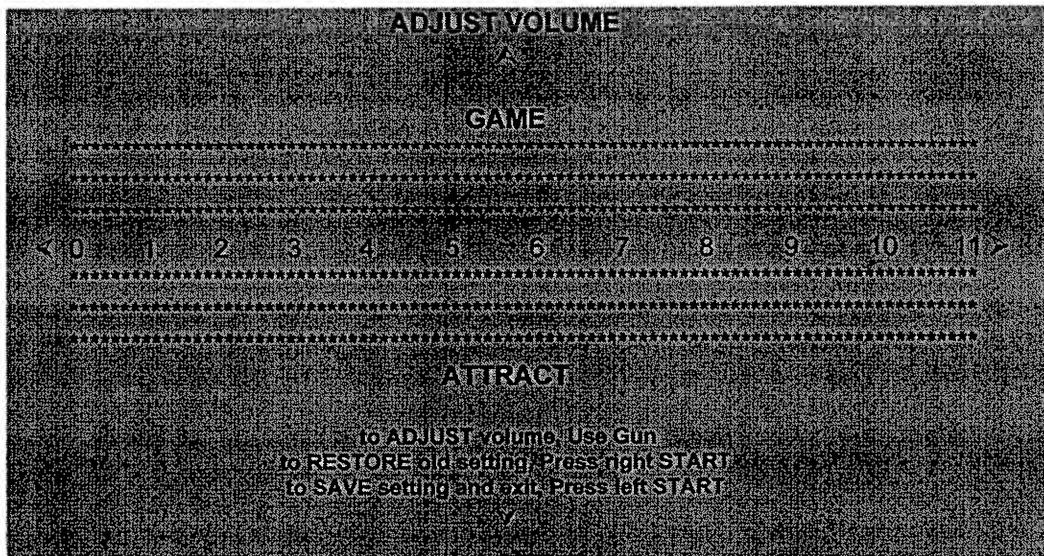


TYPICAL SELECT TEST MENU SCREEN

VOLUME ADJUSTMENT

The Volume Adjust feature allows the operator to determine the sound and music level of the game.

The volume level can be adjusted for either the Attract Mode or the Game. Press the Volume Up button to raise the volume level and the Volume Down button to lower the volume level. Fire a gun at the left or right arrows to raise or lower the volume level. Music is played continuously while this screen is active.



VOLUME ADJUSTMENT MENU SCREEN

Shoot a gun at the up or down arrows to choose either "Game" or "Attract" volume adjustment. When the selected variable is flashing on the screen, shoot the left or right arrows to change the level as desired.

The volume level is represented on-screen by the length of a bar made of dots. A longer bar indicates a higher volume setting than a short bar. Factory default for "Game" and "Attract" volume levels is 7.

The "Game" volume is continuously adjustable from zero to eleven. The game will seem more realistic if the player experiences high volume sounds during play (these weapons do not have silencers).

The "Attract" volume is continuously adjustable from minimum (zero or MUTE) to maximum (FULL). For greater profits, adjust your volume levels to a loud setting to draw attention to this game.

The "Attract" and "Game" volume levels interact. The two levels may be adjusted to different values independently, but "Attract" cannot be set higher than the level chosen for normal game play. If the "Game" volume level is lowered, it will automatically lower the "Attract" level. Lowering the "Attract" volume level will not affect the "Game" setting. Raising the "Attract" volume will simultaneously raise the "Game" setting after the "Attract" volume reaches the "FULL" setting.

Be certain to press only the left START button after any volume adjustments have been made. The right START button will cancel any settings on the screen and return both levels to the previous screen values.

NOTE: These adjustments affect the volume of the tests as well as the game play. If the volume levels are set to minimum (zero), there will be no sounds from the speakers during any of the audio tests. It is recommended that the volume levels be set to a moderately high value each time the sound portion of the game or the speakers are checked. The levels may be returned to their previous settings after the tests have been completed.

STATISTICS

The Statistics report allows the operator to assess how well the game is being played. In addition to the earnings, various game aspects are tracked to determine the player skill levels.

Statistics may be reset to zero or allowed to increase after each viewing. To reset the statistics, hold the right START button, then press the left START button.

Coin 1 Coins	0
Coin 2 Coins	0
Coin 3 Coins	0
Coin 4 Coins	0
Bill Value	0
Aux Coins	0
Idle Mins	0
1 Player Mins	0
2 Player Mins	0
Session Mins	0
New Games	0
Cont Games	0
Games Won	0
Mach Sessions	0
Error Count	0
Total Coins	0
Percentage Play	0

To clear these counters
hold right START and press left START
for more stats. Press left START

STATISTICS REPORT MENU SCREEN

The illustration shows how the report screen will look after the game has been reset or is first turned on. Most of the statistics will increase in value as the game is played. It is normal for some values to remain at zero: for example, the Aux Coins count will not change unless an additional Currency Acceptor has been installed in the game, and the Error Count will not change if no errors have occurred.

Low counts in both coin and player statistics may indicate that the game is too difficult for the skill levels of the players at this location; high continue counts may indicate that the game is not difficult enough. The difficulty level and other play characteristics may be adjusted from the Game Options menu.

Record the Statistics before doing any service or repairs are done on this game.

Press the left START button to view the additional game statistics. The HISTOGRAMS sub-menu displays, allowing three choices to graphically represent player progress.

Select CLEAR ALL HISTOGRAMS to cancel any settings on the screen and return all counts to the factory default values.

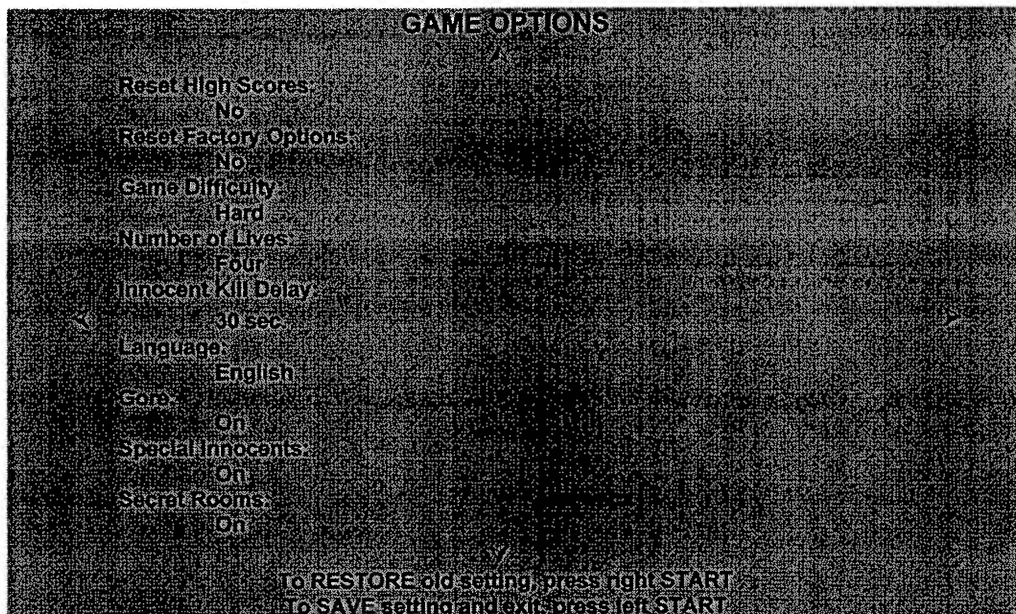
The HISTOGRAMS screens will have no bar graphs until the system has enough data to plot.

When the system detects an error, a USER MSGS screen will appear on screen.

GAME OPTIONS

These adjustments allow the operator to customize the game. Each of the variables will change some aspect of game appearance or play. Optimum settings cause high player interest and increase earnings.

Use a gun or the left START button to select a menu item. The gun is also used to view the range of choices and change its value. Options may be reset to factory defaults or changed after each viewing. Use the up or down arrows to scroll to other menu options, if MORE ABOVE or MORE BELOW appears on screen.



GAME OPTIONS MENU SCREEN

The illustration shows how this report screen will look after the game has been reset or is first turned on. Fire a gun at the left or right arrows to advance a variable through its range of choices. Some items have more options than others. View all of the choices before selecting one.

The effects of these options can be judged by comparing statistics reports before and after changes were made. As players become more familiar with the game, new features or increased difficulty will make the game challenging and continue to generate interest.

Innocents are the unarmed people who appear periodically as they try to escape from the terrorists.

The Secret Rooms allow players to collect extra points by demonstrating their target shooting skills.

Selection of a different Language changes the player information presented on the screen during a game. It does not change any of the voice announcements, menu screens or tests.

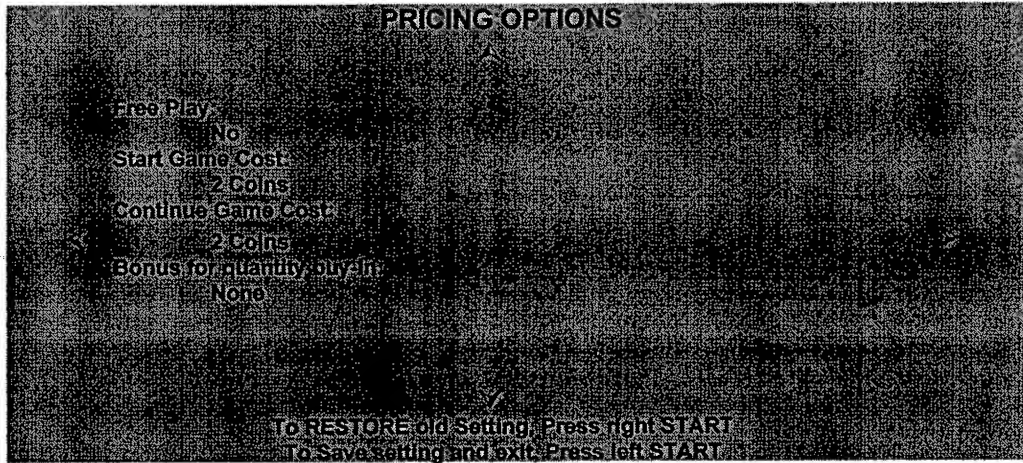
Record the High Scores before making any option changes to this game.

NOTE: Changes to Game Difficulty or Number of lives will automatically reset the Player High Scores, since these variables directly affect the ability to collect points.

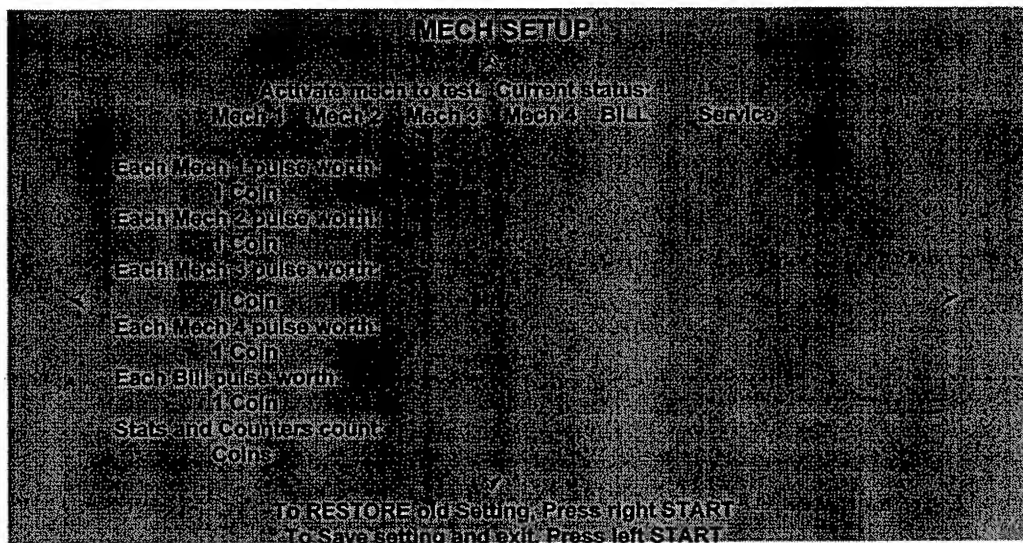
COIN OPTIONS

The Coin Options are used to set up the coin mechanisms and adjust the pricing of the games. Factory default values can be considered standard.

Use a gun or the left START button to select a menu item. The gun is also used to view the range of choices and change its value. Options may be reset to factory defaults or changed after each viewing.



PRICING OPTIONS MENU SCREEN



MECH SETUP MENU SCREEN

The illustrations show how these screens will look with all of the factory default settings. Fire a gun at the left or right arrows to advance a variable through its range of choices. Some items have more options than others. View all choices before selecting one.

PRICING OPTIONS

Custom pricing sets credits required to start and continue a game, rewards for buy-in and winning, etc. There are no other options if free play is selected. Free game player incentives may reduce earnings.

MECH SETUP

Mech setup permits the operator to add or remove coin or bill mechanisms. Although values are shown for all devices, changes to unused inputs will have no effect if there is no such mechanism in the game.

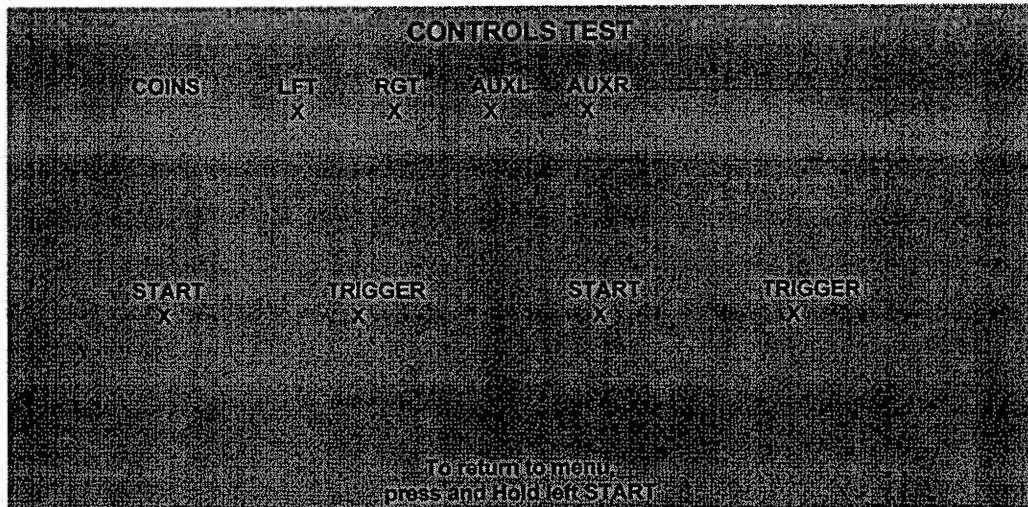
CONTROLS TEST

These tests allow the operator to manually check each switch in the game. Gun aim is tested separately.

NOTE

Some switches may not be used with this game. Check the wiring diagram before testing.

Use any gun to select the Controls Test. Press the right START button to begin the test. Activate each switch and the switch indication on the screen changes from "X" to "O". Release the switch and the indicator returns to its previous normally open or closed condition. Switches may be tested in any combination.



CONTROLS TEST MENU SCREEN

PLAYER CONTROLS are shown on the screen just as they are found on the cabinet control panel. Each switch change should be exactly duplicated by a single indication on the menu screen.

The Player Controls Tests are used to verify crossed wires, intermittent conditions, and stuck switches.

OPERATOR CONTROLS are shown on the screen just as they are found on the coin door bracket. Each switch change should be exactly duplicated by a single indication on the menu screen.

The Operator Controls Tests are used to verify crossed wires, intermittent conditions, and stuck switches.

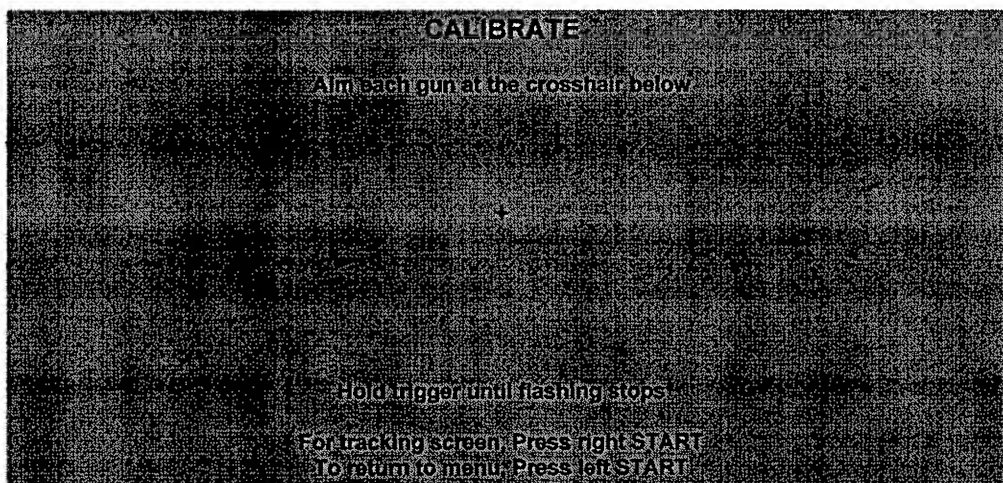
The Coin and Cabinet Switches are shown on the screen without regard for their actual game location. Each switch change should be exactly duplicated by a single indication on the menu screen.

These Switch Tests are used to verify crossed wires, intermittent conditions, and stuck switches.

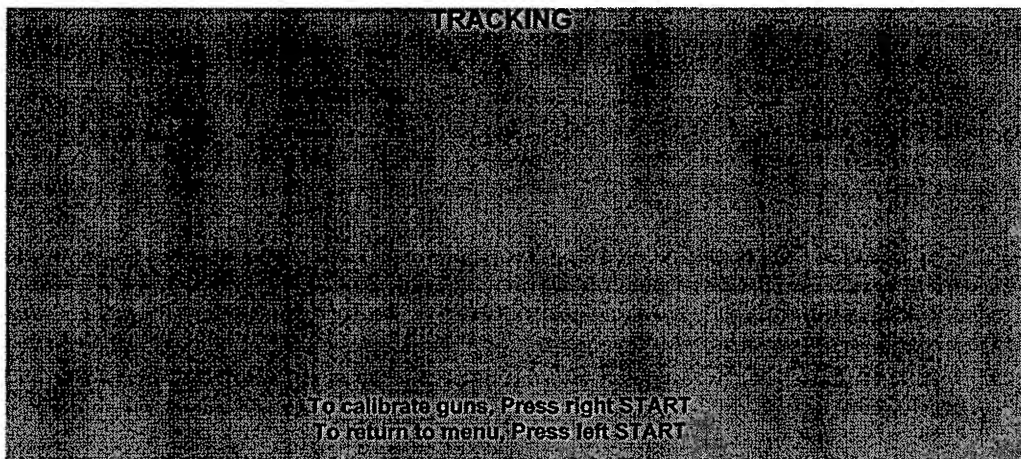
GUN TESTS

These tests allow the operator to change gun calibration and verify precise aim for all points on the screen. Inaccurate firing will discourage players quickly and reduce repeat game play.

Use a gun to select Gun Tests. Press the right START button to begin the test. Aim and fire each gun at the target until the screen indicates successful calibration. Check all guns for tracking after adjustment. The crosshair of each gun should be continuously visible on all parts of the screen during the TRACKING test if the gun is properly calibrated. If the crosshair stops moving or disappears while the gun is aimed at any part of the screen, recalibrate the gun and repeat the TRACKING test.



GUN CALIBRATION SCREEN



GUN TRACKING SCREEN AND CROSSHAIR EXAMPLE

The illustrations show how these screens will look with all of the factory default settings. Fire only one gun at a time to avoid miscalibration. Test and recalibrate guns often to keep the game at maximum earnings.

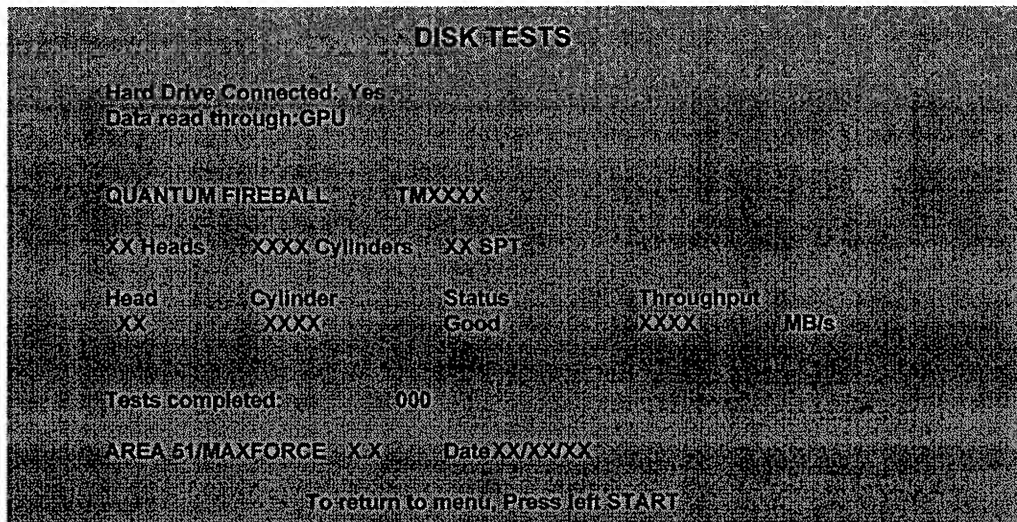
No amount of calibration and testing can fix a dirty optical system, loose components, defective cables, etc. Before calibrating, check the gun barrels for dirt or debris (kit includes a tamper-resistant wrench).

Stand directly behind the gun holder and extend the cable to its full length during these gun tests.

NOTE: Bright overhead lights can occasionally interfere with proper optical gun operation or use. Reduce light levels and recalibrate guns to eliminate this problem as a source of inaccuracy.

DISK TESTS

The Disk Tests allow the operator to verify the functions of the Hard Disk Drive Assembly.



DISK TESTS MENU SCREEN

Hard Drive Connected

This verifies the interface between CPU Board and Hard Disk Drive. The test takes less than 1 second. The processor requests disk information, but data cannot be retrieved successfully if there is a problem. The results of the test will be reported as pass or fail messages; error messages may be included.

Data read through

This test identifies the processor assigned to the disk drive data. The test takes less than 1 second.

Drive ID and Logical Sectors Available

These lines report the type of drive and the number of data storage areas found on the hard disk. This number is a result of the disk format that determines how information will be placed on the disk.

Sector Test

This test will perform a sector by sector read/verify test on the disk drive. As the status of each sector block is checked, the speed of the data transfer is compared to its acceptance limits (about 1 per second). The results of the test will be reported as pass or fail messages; error messages may be included.

Tests Completed

These tests run over and over. The number increases each time the cycle repeats (approx. 15 minutes).

Program ID

This identifies the game revision number and date of the software on the hard disk drive.

MEMORY TESTS

The Memory Tests allow the operator to verify some functions of CPU Board Assembly memory circuits.

NOTE

These tests detect system errors, not actual game errors. The game program is on the Hard Disk Drive.

Use a gun to select a menu item. Press the right START button to begin the test. There are no custom settings or adjustable variables in these tests.



MEMORY TESTS MENU SCREEN

COLOR RAM performs a fast check of the storage area for the game video images. This test takes less than 2 seconds to run. After completion, if there are no errors, the MEMORY TESTS screen is displayed.

WORKING RAM performs a fast check of the storage area for the game variables. This test takes less than 2 seconds to run. After completion, if there are no errors, the MEMORY TESTS screen is displayed.

DRAM BANK 1 performs a fast check of the storage area for the game program. This test takes less than 5 seconds to run. After completion, if there are no errors, the MEMORY TESTS screen is displayed.

DRAM BANK 2 performs a fast check of the storage area for the game program. This test takes less than 5 seconds to run. After completion, if there are no errors, the MEMORY TESTS screen is displayed.

ALL RAM performs a more thorough check of the storage circuits, one at a time. This test takes less than 10 seconds to run. After completion, if there are no errors, the MEMORY TESTS screen is displayed.

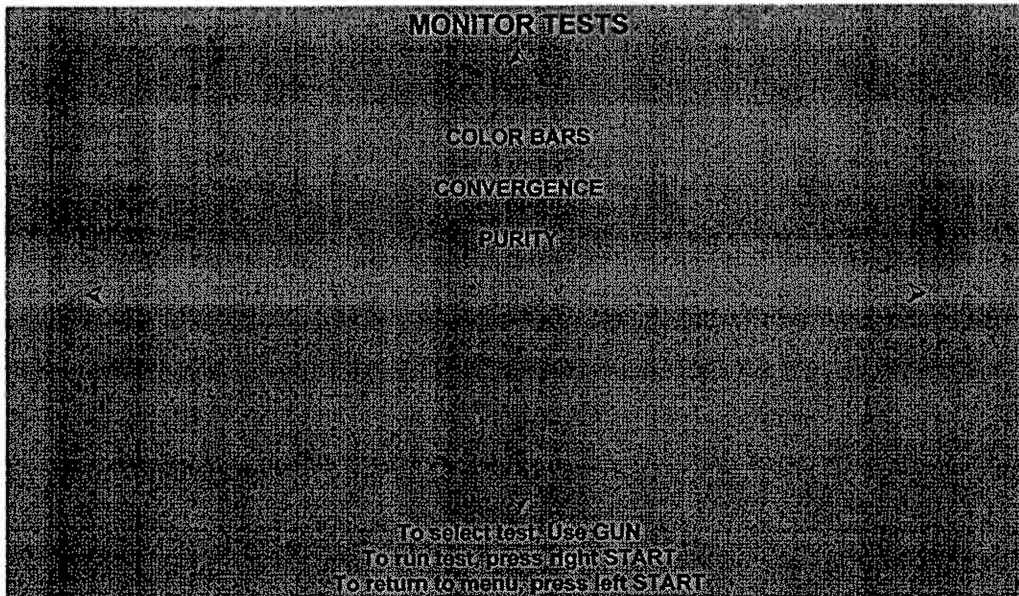
ROM TEST performs a fast check of the storage area for the game instruction set. This test takes less than 2 seconds to run. After completion, the results of the test will be reported as pass or fail messages; error messages may be included. Press the left START button to return to the MEMORY TESTS screen.

If errors are detected during these tests, record them and return to the SELECT TEST menu. Turn Off the game power and allow it to sit for a few minutes. Turn On the game and repeat these MEMORY TESTS. Record any remaining errors and compare them to the others (refer to Troubleshooting in Section Four).

MONITOR TESTS

The Monitor Tests provide patterns for verifying the monitor performance or making adjustments.

Use a gun or left START button to select a menu item. Press the right START button to begin the test. Once the menu is open, use a gun or the left START button to select an option, and the right START button to begin it. Press the right START button again to return to the Monitor Tests menu screen.



MONITOR TESTS MENU SCREEN

COLOR BARS fills the screen with shades of colors to verify red, green, blue and white level dynamic adjustments. Each color bar should appear sharp, clear, and distinct from bars on either side.

Borders must be visible on top, bottom, and both sides of the screen. The color bars should not change screen position or color as the background or border are removed or restored from the video display.

The Color Bars screen is useful in adjusting the monitor brightness and contrast.

CONVERGENCE tests fill the screen with a grid and a series of dots. The grid and the dots should be all one color, with no fringes or parallel images. The lines should be straight and the dots round.

Borders must be visible on top, bottom, and both sides of the screen. Lines and dots should not change screen position or color as the background or border are removed or restored from the video display.

The Convergence tests are useful in verifying the monitor convergence, linearity, and dynamic focus.

PURITY tests fill the screen with 100% of the chosen color at normal intensity. Each screen should be absolutely uniform from top to bottom and side to side. No retrace lines or noise should be visible.

In the first series of tests, borders must be visible on top, bottom, and both sides of the screen. Image color should not change screen position or color as the background or border are removed or restored from the video display. A second series of tests removes the border and any text, filling the screen entirely with the test color. Press the right START button to move through the test colors.

The Purity tests are useful in verifying monitor intensity, black level, blanking and automatic degaussing.

DIP SWITCHES AND JUMPERS

The CPU Board has a number of hardware variables that can be changed to adapt this assembly to other uses. Jumpers determine which circuit paths are active, and DIP switches select instructions.

Switches

There is one slide switch on the CPU Board. This switch duplicates the coin door TEST switch function. This switch should be set to its OFF position (Factory default) for the program to operate properly. A message will prompt you to reset this switch to the correct position as you try to return to normal play.

Jumpers

Jumpers on the CPU Board are used to control audio and video signals to other components in this game. These signals are set to match the production audio amplifiers, speaker system, and video monitors.

The active circuit paths have been optimized at the factory during the board test procedure. Refer to Wiring (Section Three) for the function of each jumper and recommended settings.

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

MAXIMUM FORCE/ AREA 51TM UNIVERSAL KIT

SECTION THREE

WIRING

Warning

Failure to reconnect all ground wires or replace metal shields and covers with each mounting screw installed and securely tightened may result in radio frequency interference.

JAMMA Chart

FUNCTION	WIRE COLOR	PIN	PIN	WIRE COLOR	FUNCTION
Ground	Black	A	1	Black	Ground
Ground	Black	B	2	Black	Ground
+5VDC	Red	C	3	Red	+5VDC
+5VDC	Red	D	4	Red	+5VDC
-5VDC	Yellow	E	5	Yellow	-5VDC
+12VDC	Orange	F	6	Orange	+12VDC
Key	N/C	H	7	N/C	Key
Coin Counter 2	Brown-Red	J	8	Brown	Coin Counter 1
Not Used	N/C	K	9	N/C	Not Used
Speaker -, Left	Brown-Gray	L	10	Red-Gray	Speaker +, Left
Speaker +, Right	Brown-White	M	11	Red-White	Speaker -, Right
Video Green	Yellow-Green	N	12	Yellow-Red	Video Red
Video Sync	Yellow-White	P	13	Yellow-Blue	Video Blue
Service Credits	White-Gray	R	14	Yellow-Black	Video Ground
Slam Tilt	Black-Green	S	15	Black-Blue	Test
Coin 2	Black-Red	T	16	Black-Brown	Coin 1
2 Start	Violet-White	U	17	White	1 Start
2 Up	Violet-Black	V	18	White-Black	1 Up
2 Down	Violet-Brown	W	19	White-Brown	1 Down
2 Left	Violet-Red	X	20	White-Red	1 Left
2 Right	Violet-Orange	Y	21	White-Orange	1 Right
2 Switch A	Violet-Yellow	Z	22	White-Yellow	1 Switch A
2 Switch B	Violet-Green	a	23	White-Green	1 Switch B
2 Switch C	Violet-Blue	b	24	White-Blue	1 Switch C
2 Switch D	Violet	c	25	White-Violet	1 Switch D
Not Used	N/C	d	26	N/C	Not Used
Not Used	N/C	e	27	N/C	Not Used
Ground	Black	f	28	Black	Ground
SOLDER SIDE			COMPONENT SIDE		

Control wires that are not part of the Main JAMMA Harness.

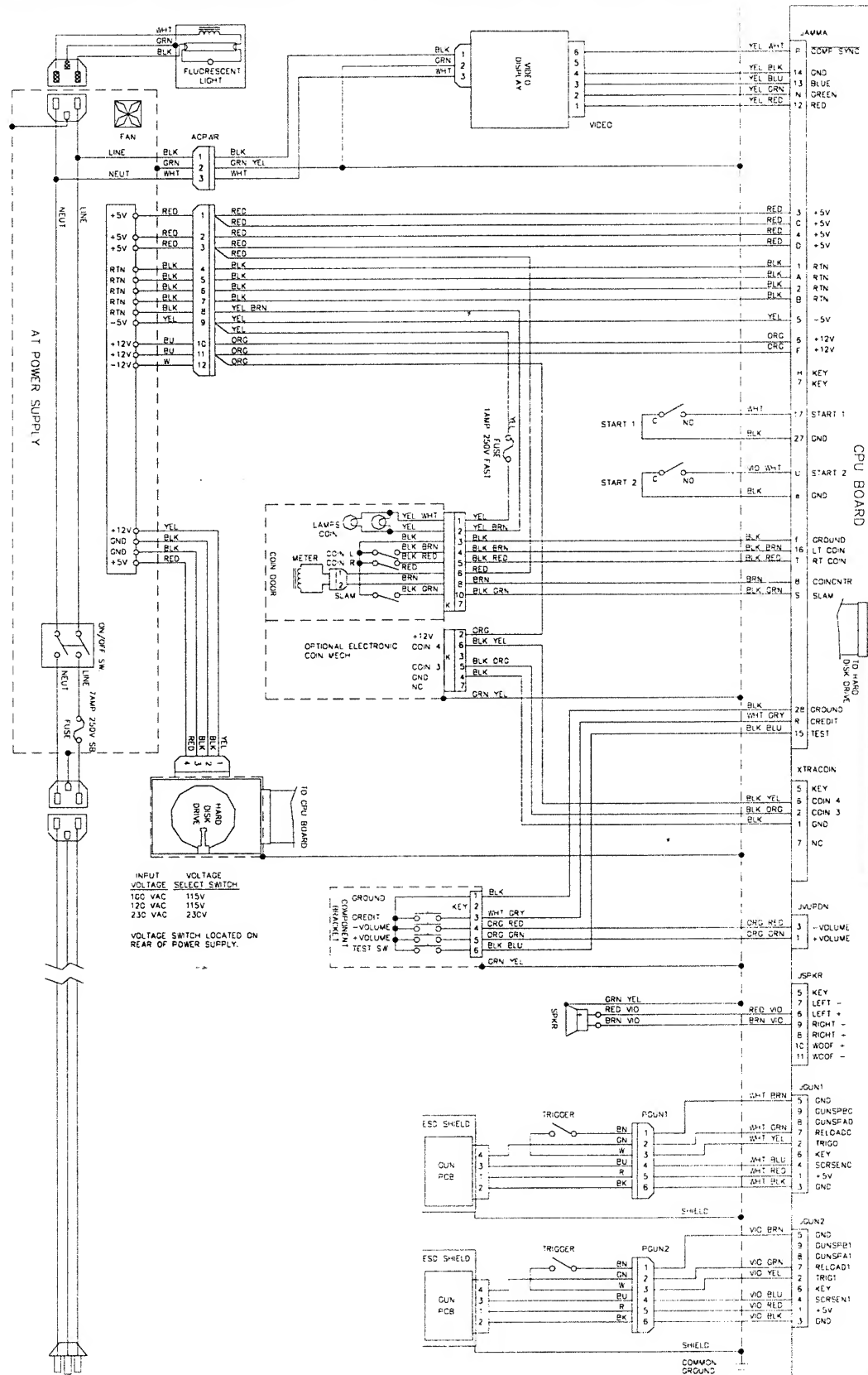
4 Start	Grey-White	6	6	Blue-White	3 Start
4 Up	Grey-Black	7	7	Blue-Black	3 Up
4 Down	Grey-Brown	8	8	Blue-Brown	3 Down
4 Left	Grey-Red	9	9	Blue-Red	3 Left
4 Right	Grey-Orange	10	10	Blue-Orange	3 Right
4 Switch A	Grey-Yellow	11	11	Blue-Yellow	3 Switch A
4 Switch B	Grey-Green	12	12	Blue-Green	3 Switch B
4 Switch C	Grey-Blue	13	13	Blue	3 Switch C
4 Switch D	Grey-Violet	14	14	Blue-Violet	3 Switch D

D.C. Power Source Voltage Limits

FUNCTION	RANGE LIMITS	COLOR	FUNCTION	RANGE LIMITS	COLOR
Digital Circuits	+4.90V to +5.10V	Red	Coin Lights	-4.75V to -5.25V	Yellow
Audio, Lights	+11.5V to +12.5V	Orange	Auxiliary Power	-11.5V to -12.5V	Blue

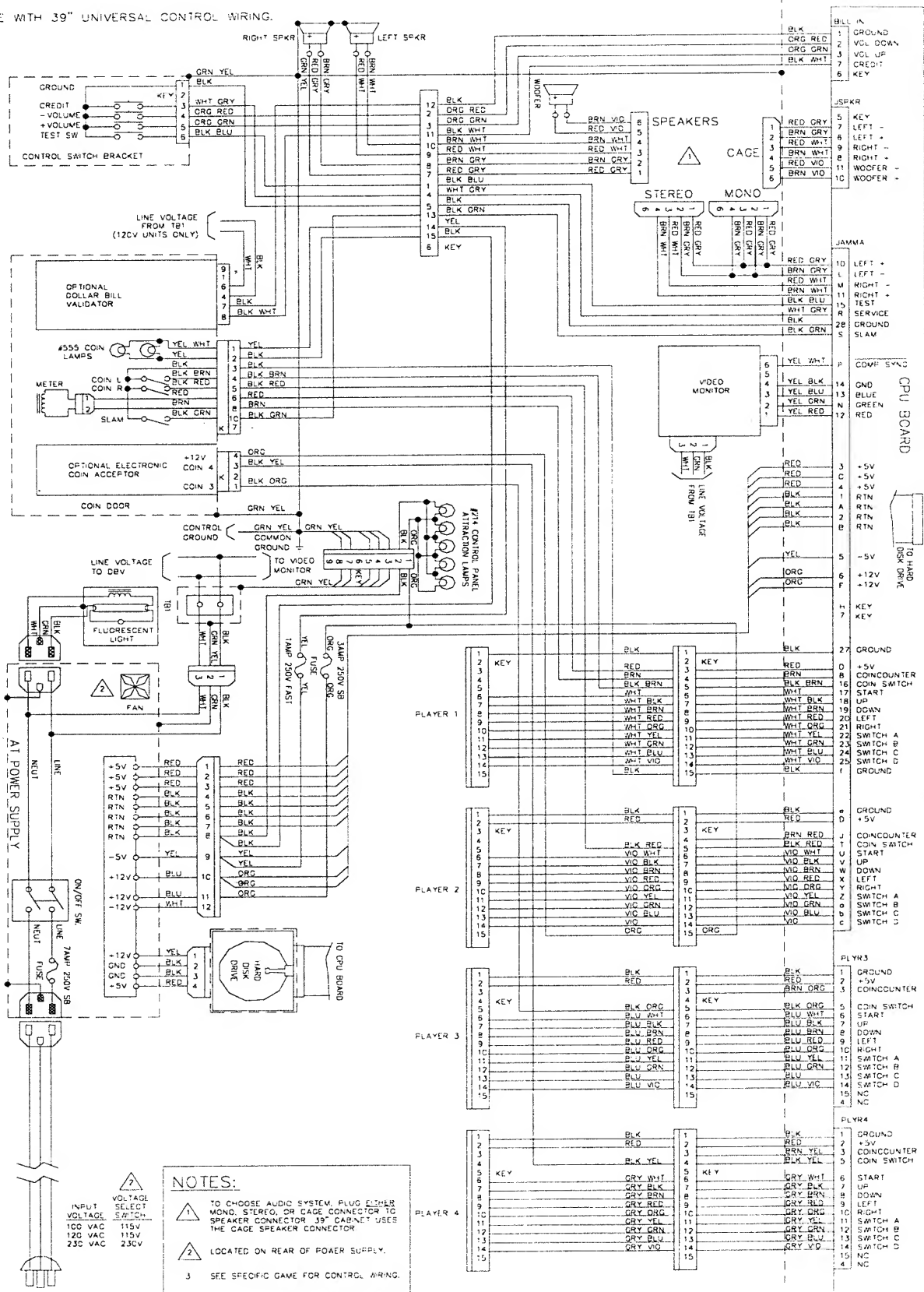
NOTE: Power Supply has +5V adjustment. Other source voltages are all fixed. Set the voltage so that the TOO HIGH and TOO LOW voltage LED indicators on the CPU Board are both OFF.

RECOMMENDED UNIVERSAL FAMILY CABINET WIRING DIAGRAM



RECOMMENDED SHOWCASE CABINET WIRING DIAGRAM

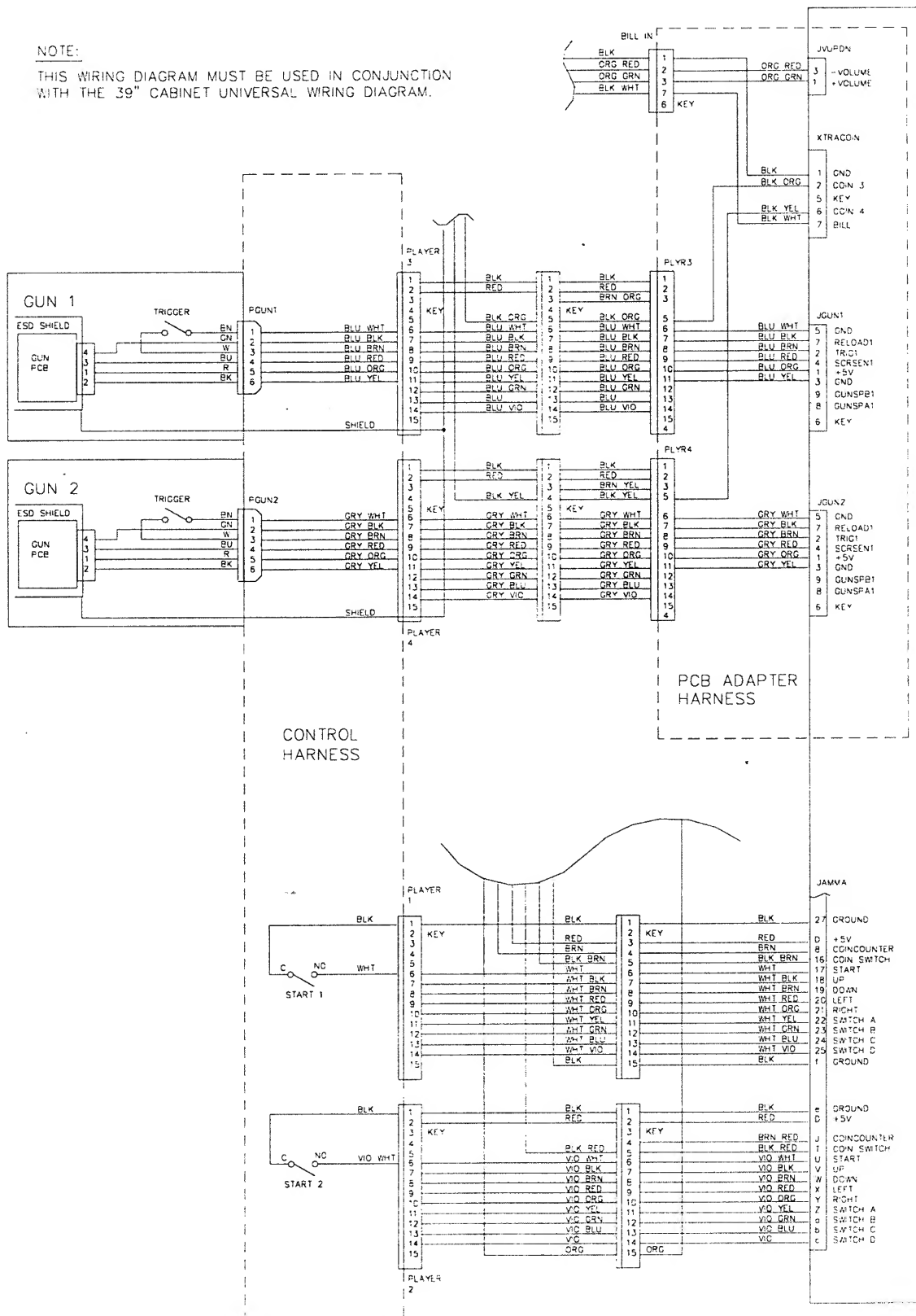
NOTE: USE WITH 39" UNIVERSAL CONTROL WIRING.



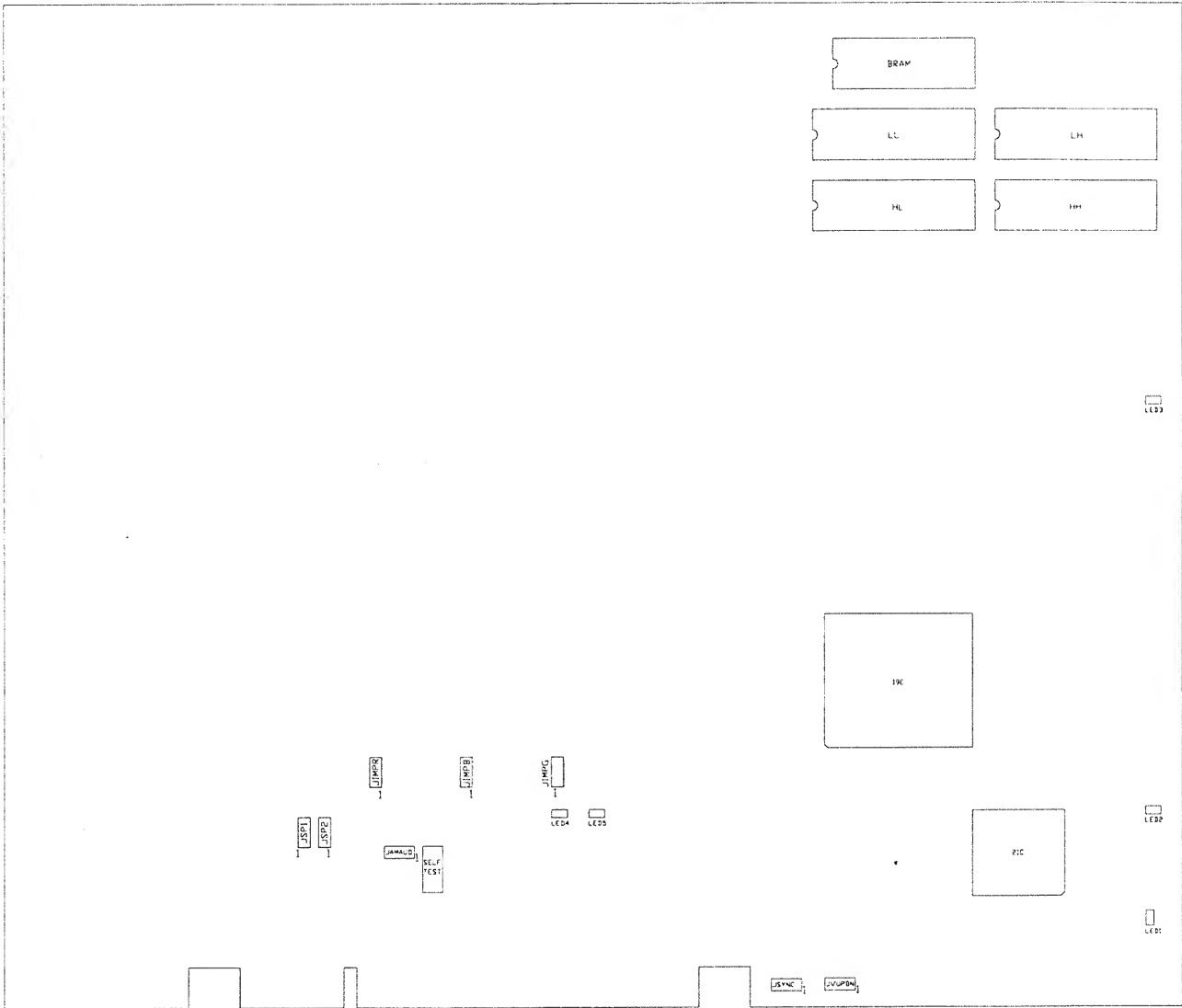
RECOMMENDED SHOWCASE CABINET CONTROL SECTION WIRING DIAGRAM

NOTE:

THIS WIRING DIAGRAM MUST BE USED IN CONJUNCTION WITH THE 39" CABINET UNIVERSAL WIRING DIAGRAM.



A-21629 **CPU BOARD ASSEMBLY**



INDICATOR, SWITCH AND JUMPER LOCATIONS

CPU SWITCHES

DESIGNATION	LOCATION	FUNCTION	POSITIONS	STATE	MEANING
S1	MIDDLE CENTER NEAR JAMMA	SETS GAME IN TEST MODE	1	OFF	NORMAL OPERATION
				ON	FORCED TEST MODE

NOTE:

This switch is used primarily for CPU Board bench tests. The coin door TEST switch activates the same circuits.

CPU BOARD JUMPER POSITION CHART

DESIGNATION	LOCATION	FUNCTION	POSITION	STATE	MEANING
JAMAUD	BOTTOM CENTER NEAR SWITCH S1	AUDIO MODE SELECTION	PINS 1 & 2	MONO SOUND	ALL CHANNELS MONAURAL
			PINS 2 & 3	STEREO SOUND	TWO CHANNEL LEFT AND RIGHT
JSP1	LOWER LEFT NEAR JAMMA	L SPEAKER SELECTION	PINS 1 & 2	BI-AMP- LIFIED	ONE SUBWOOFER IS REQUIRED
			PINS 2 & 3	UNI-AMP- LIFIED	FULL RANGE SPEAKERS ONLY
JSP2	LOWER LEFT NEAR JAMMA	R SPEAKER SELECTION	PINS 1 & 2	BI-AMP- LIFIED	ONE SUBWOOFER IS REQUIRED
			PINS 2 & 3	UNI-AMP- LIFIED	FULL RANGE SPEAKERS ONLY
JMPR	LOWER MIDDLE NEAR SWITCH S1	RED VIDEO SIGNAL LEVEL	PINS 1 & 2	MEDIUM 1-2 VOLTS	STANDARD VIDEO INPUT VOLTAGE
			PIN 2 ONLY (OPEN)	LOW < 1 VOLT	LOW VIDEO INPUT VOLTAGE
			PINS 2 & 3	HIGH > 2 VOLTS	HIGH VIDEO INPUT VOLTAGE
JMPB	LOWER MIDDLE NEAR SWITCH S1	BLUE VIDEO SIGNAL LEVEL	PINS 1 & 2	MEDIUM 1-2 VOLTS	STANDARD VIDEO INPUT VOLTAGE
			PIN 2 ONLY (OPEN)	LOW < 1 VOLT	LOW VIDEO INPUT VOLTAGE
			PINS 2 & 3	HIGH > 2 VOLTS	HIGH VIDEO INPUT VOLTAGE
JMPG	LOWER MIDDLE NEAR SWITCH S1	GREEN VIDEO SIGNAL LEVEL	PINS 1 & 2	MEDIUM 1-2 VOLTS	STANDARD VIDEO INPUT VOLTAGE
			PIN 2 ONLY (OPEN)	LOW < 1 VOLT	LOW VIDEO INPUT VOLTAGE
			PINS 2 & 3	HIGH > 2 VOLTS	HIGH VIDEO INPUT VOLTAGE

NOTES:

1. Use the JAMAUD jumper for cabinets with one channel speaker systems. Factory default is stereo sound.
2. Use the JSP jumpers for cabinets with a separate monaural subwoofer. Factory default is full range only.
3. Use the JMP jumpers for cabinets with non-standard video monitors. Factory default is Medium volt level.

Recent production Neotech, Hantarex, and Wells-Gardner monitors match the Medium voltage setting.

Early production Neotech and other lower impedance monitors match the Low voltage setting better.

JAMMA production and other higher impedance monitors match the High voltage setting better.

CPU BOARD LED INDICATOR STATUS CHART

DESIGNATION	LOCATION	FUNCTION	COLOR	STATE	MEANING
PWR/RST	BOTTOM RIGHT NEAR C66 & R31	PROCESSOR ACTIVITY	GREEN	OFF	NO POWER APPLIED
				ON	NORMAL OPERATION
				BLINKING	PROCESSOR RESETTING
DIAG	LOWER RIGHT NEAR R108 & R119	DIAGNOSTIC CONDITION	GREEN	OFF	NO POWER APPLIED
				ON	NORMAL OPERATION
				BLINKING	MEMORY CIRCUIT FAULT
HDBUSY	MIDDLE RIGHT NEAR C178 & R243	HARD DISK ACTIVITY	YELLOW	OFF	NO HARD DISK DRIVE ACTIVITY
				ON	HARD DISK DRIVE ERROR
				BLINKING	NORMAL OPERATION
TOO HIGH	LOWER MIDDLE NEAR R110 & R111	VOLTAGE LIMITS	RED	OFF	VOLTAGE IS ACCEPTABLE
				ON	VOLTAGE IS TOO HIGH
				BLINKING	POWER SUPPLY ERROR
TOO LOW	LOWER MIDDLE NEAR R110 & R111	VOLTAGE LIMITS	RED	OFF	VOLTAGE IS ACCEPTABLE
				ON	VOLTAGE IS TOO LOW
				BLINKING	POWER SUPPLY ERROR

NOTES:

1. PWR/RST LED monitors Boot ROM activity. Should be active during power on or reset.
2. DIAG LED indicates processor data bus activity. Should always be active during game play.
3. HDBUSY shows Hard Disk Drive activity. May appear continuous at start; short bursts during game play.
4. TOO HIGH indicates excessive Power Supply voltage. Reduce voltage until light extinguishes.
5. TOO LOW indicates insufficient Power Supply voltage. Increase voltage until light extinguishes.

MAXIMUM FORCE/ AREA 51TM UNIVERSAL KIT

SECTION FOUR

TROUBLESHOOTING

This game uses complex electronic components that are very SENSITIVE to static electricity. The following precautions must be observed and followed prior to handling any of the game electronics.

1. Ensure that the A.C. power to the game is turned OFF prior to servicing the electronics.
2. Discharge any static electricity build up in your body by touching the safety ground stud of the power supply chassis while the line cord is connected to a properly grounded outlet. This is to be done BEFORE touching or handling the electronic assemblies.
3. Store the electronic assemblies in an anti-static area. Anti-static bags are to be used to store or transport the game CPU Board Assembly.
4. DO NOT remove or connect any electronic assemblies when the cabinet power is ON. Doing so will damage the electronic assemblies and void the warranty.
5. Always replace ground wires, shields, safety covers, etc. when maintenance or service is completed. Ensure that all ground and mounting screws are installed and tightened firmly.

GAME DOES NOT START

1. Game appears completely non-functional; no audio, no illumination, no video display.

- A: Check that the Power Switch has been turned ON (on power supply at rear of the main cabinet).
- B: Turn OFF the game power. Unplug the A.C. line cord. Examine the Power Supply fuse or circuit breaker. The Power Supply Line Voltage Switch must be set to agree with the local line voltage.
- C: Remove the Line Cord. Test the line cord, power plug and I.E.C. connectors for breaks or damage. Verify the continuity of each wire in the cord. Install the cord at the Power Supply and press firmly to fully seat the connector into the supply receptacle.
- D: Unlock and open the cabinet door or panel as required to expose the game electronics. Ensure that cabinet wiring harness connectors are fully seated in the corresponding power supply and board connectors (refer to Wiring Diagram, Section Three). Inspect wiring for breaks or damage.
- E: Examine the A.C. Fuses on the A.C. Chassis or the power supply, and the D.C. Fuses on the chassis or the electronic equipment shelf. If any fuse is faulty, replace it with an identical fuse.
- F: Fully seat the A.C. plug in the power outlet. Verify that A.C. line voltage is present. Turn the game power ON. Check the D.C. wiring harness and connectors if fuse opens the circuit again.

2: Video game appears non-functional, but currency acceptor price indicator is illuminated.

- A: Unlock and open a cabinet door or panel as required to expose the game electronics. Inspect the CPU Board Assembly under low light level conditions. A glow will be seen from the Light Emitting Diodes if there is voltage in the processor circuits. This does not mean that voltages or signals are as they should be, but it does indicate that the CPU Board is receiving some D.C. power from the power supply. The power supply fan should also be operating.
- B: Turn OFF the game power. Inspect the CPU Board Assembly. Ensure that the JAMMA Wire Harness connector is attached and fully seated onto the mating board connector. Check the other wiring harness connectors in the same way.

CAUTION: DO NOT REMOVE OR INSTALL ANY CONNECTOR WHEN POWER IS TURNED ON. DOING SO WILL DAMAGE THE GAME CPU BOARD ASSEMBLY AND VOID THE WARRANTY.

- C: Verify that the game CPU Switches and jumpers are set as intended. Refer to the Board Configuration Charts (Section Three) for variables and default settings.
- D: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Power connector pins. Adjust the +5V source if it is necessary. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information and voltage limits.
- E: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.
- F: Verify that the game runs and completes the power-up self-test sequence without any errors. Note errors and/or failures found during these tests. Compare the CPU Board Assembly Light Emitting Diodes with the LED Indicator Status Chart (Section Three) and note any discrepancies.
- G: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELECT TEST menu, choose the MONITOR TESTS (refer to Section One for additional details). Use this set of tests to check the operation of each screen used in the game.

GAME CAN NOT BE PLAYED

1. Game will not accept currency or tokens and cannot be started. Audio and video are present.

- A: Unlock and open the cash door. Empty the cash box. Inspect the revenue for any counterfeit currency. Check the vault and remove any items that block the path from the mechanism.
- B: Unlock and open the coin door. Check each mechanism by hand to ensure proper mounting. Remove the mechanism and clear the currency path. Reinstall the mechanism and latch it.
- C: Verify that the mechanism is level when the doors are closed. Repair or replace the coin door if it is bent or damaged. Adjust the cabinet leg levelers if necessary to keep mechanisms vertical.
- D: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One for additional details). Use these tests to confirm the pricing and setup of each mechanism used in the game.
- E: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELF TEST menu, choose the CONTROL TESTS (refer to Section One for additional details). Use this set of tests to check the operation of each coin or bill mechanism.

2. Game accepts currency or tokens, but does not start. Audio and video are present.

- A: Unlock and open the coin door. Check each mechanism by hand to ensure proper mounting. Verify that each of the release latches is in the closed and locked position. Test known good and bad coins to see if the mechanism accepts and rejects the currency correctly.
- B: Ensure that no loose parts or wires are caught in the hinges, latches, or switch contacts.
- C: Inspect to see if the external coin door indicators (pricing, flashing arrows, etc.) are illuminated. Check connectors and cables for wiring continuity from CPU Board to the coin mechanisms.
- D: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One for additional details). Use these tests to confirm the pricing and setup of each mechanism used in the game.
- E: Check for continuity in each of the suspect switch connections (Common to Normally Open or Common to Normally Closed). Replace faulty switches (bent levers, broken actuators, etc.).
- F: Verify that each coin mechanism is operating properly by placing it in a known good unit.

3. Bill validator does not function after field installation. Coin mechanisms operate properly.

- A: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One). Confirm pricing and setup. Check validator switch settings against manufacturer's instruction sheet.
- B: Inspect to see if the external coin door indicators (pricing, flashing arrows, etc.) are illuminated. Ensure that no loose parts or wires are caught in the hinges, latches, or switch contacts. Verify that the harness connectors are attached and fully seated. Check for validator cable continuity.
- C: Verify that the bill validator is operating properly by placing it in a known good unit.

GUN PROBLEMS

1: Players complain that one or more guns do not hit the targets. Game starts normally.

- A: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELECT TEST menu, choose the GUN TEST (refer to Section One for additional details). Use the TRACKING test to confirm the accuracy of each gun in the game. Check the aim from several typical player positions. The crosshair must remain in the gun sight at all points on the screen. Return to this screen each time the guns are cleaned or repaired.
- B: From the SELECT TEST menu, choose the GUN TEST (refer to Section One for additional details). Use the CALIBRATION screen to reset the aim of each gun. Stand directly behind the gun holder and extend the cable to its full length to ensure the greatest accuracy.
- C: Inspect each gun for missing screws, loose or damaged parts, broken cables, etc. Examine the gun barrel and the lens for dirt or debris. ***Do not apply cleaner directly into the gun barrel.***
- D: Remove screws as required to free the control panel. Remove the guns from the holders and drape the cables over the speaker grilles or rest them on the floor. Protect the speaker grilles where the holders will touch. Grip holders and carefully tilt the control panel back on its hinge. Ensure that no loose parts or wires are caught in the hinge or switch contacts. Check the gun cable grounds for continuity and verify that the harness connectors are attached and fully seated.
- E: Verify that each gun assembly is operating properly by placing it in a known good unit.

2: Guns fire erratically when trigger is pulled. Problem may be related to firing position of gun.

- A: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELECT TEST menu, choose the CONTROLS TEST (refer to Section One for additional details). Use these tests to confirm the operation of the gun trigger switches. Hold the trigger down and shake each gun cable to test the wiring.
- B: From the SELECT TEST menu, choose the GUN TEST (refer to Section One for additional details). Use the TRACKING test to confirm the accuracy of each gun in the game. The crosshair must remain in the gun sight at all points on the screen. Vary the gun angle during these tests. Examine the gun barrel and the lens for dirt and debris.
- C: Reduce or eliminate bright lights from overhead, front or sides of the cabinet and recheck tracking. If this solves the trouble, then the environment is the problem and not the game. Change the lighting or relocate the game. If the problem remains, check the gun switch continuity. Ensure that the trigger switch mounting screws are not loose or missing.

3. Guns are intermittent or completely non-functional. Game starts normally.

- A: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELECT TEST menu, choose the GUN TEST (refer to Section One for additional details). Use the CALIBRATION screen to reset the aim of each gun. Stand directly behind the gun holder and extend the cable to its full length to ensure the greatest accuracy. Use the TRACKING test to confirm the accuracy of each gun in the game.
- B: Remove screws from gun. Separate pieces at handle end first, using care not to dislodge parts (trigger is spring loaded). Check the gun board and switch connectors. Clean lens to remove fingerprints and dust, then reinstall any shields removed during disassembly. Verify a good connection exists between the static shield and the cable ground when the gun is reassembled.
- C: Verify that each gun assembly is operating properly by placing it in a known good unit.

AUDIO PROBLEMS

1: Audio is non-functional, but video is present and game appears to operate normally.

- A: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELECT TEST menu, choose ADJUST VOLUME (refer to Section One for additional details). Verify that attract and game volume levels have not been set at Zero. Change the levels if necessary to make the game audible.
- B: Follow the on-screen instructions to return to the first menu. From the SELECT TEST menu, choose SOUND TESTS. Use these tests to confirm the operation of each speaker in the cabinet.
- C: Turn OFF the game power. Remove grilles and inspect speakers. Ensure that no loose parts or wires are caught in speaker cones, terminals, mounting screws, or stuck to the magnets.
- D: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Power connector pins. Verify the +5V, -5V and +12V sources. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information and voltage limits.
- E: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.
- F: Verify proper operation of game CPU Board Assembly by placing it in a known good game.

2: The audio is distorted, muffled or missing frequencies. A constant low hum may be present.

- A: Enter the game Menu System by pressing and holding the TEST MODE switch. From the SELECT TEST menu, choose SOUND TESTS. These tests will verify some of the functions of the audio circuits in this game.
- B: Turn OFF the game power. Remove the grills and check the speakers. Ensure that each small speaker is FULL RANGE (100 to 10,000 Hz response) and rated for at least 10 WATTS. The larger speakers must rate at least 25 WATTS.
- C: Check that the speaker wiring is not reversed at one of the speakers. Weak low frequencies and a thin or hollow sound quality is a symptom of incorrectly phased speakers. This condition will not be detected by the SOUND TESTS, but it will be audible during normal game operation.
- D: Check that the cabinet wiring is correct for this game. Verify that the cabinet wiring provides separate wires (not a common return) for each speaker. Ensure that all cabinet ground wires are connected. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information.
- E: Using the 2 Volt A.C. setting on a digital voltmeter, measure voltages at the speaker terminals. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.
- F: Verify that the speaker is operating properly by placing in a known good unit.

3: The audio is monaural (it should be stereo). The separate woofer may not be functioning.

- A: Verify that cabinet wiring for this game is correct. Ensure that speakers are connected to the CPU Board JAMMA audio output wires or the JSPKR cable, but not both. Check for shorted wires. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information.
- B: Check CPU Board jumper positions. JSP1 & JSP2 control the woofer; JAMAUD controls stereo.

VIDEO PROBLEMS

1. Monitor appears non-functional, but audio is present and controls operate as expected.

- A: Open the cabinet to expose the Video Monitor. Verify that A.C. Power is connected to the Video Monitor. Inspect the neck of the CRT under low light level conditions. A glow will be seen near the CRT base if there is voltage in the filament circuits. This does not mean that other voltages or signals are as they should be, but it does indicate that monitor circuits are receiving some power.
- B: Turn OFF the game power. Verify that the Video Signal and the Remote Adjustment Board connectors are fully seated on the Video Monitor Board Assembly. Check the other monitor connectors in the same way. ***Do not operate a monitor without a Remote Adjustment Board.***
- C: Examine the A.C. line fuse on the Video Monitor Board Assembly. If the fuse is faulty, replace it with an identical fuse of the proper voltage and current rating.
- D: Ensure that no loose parts or wires are caught on the chassis or the mounting brackets.
- E: Check that the brightness (intensity) and contrast have not been set to their minimum levels.
- F: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

2: The power-up self-test will run, but the game does not appear. No audio is present.

- A: Note and record any error messages that occur during self-test. Press and hold the TEST MODE switch to enter the menu system. From the SELECT TESTS menu, choose DISK TESTS. These tests will verify some of the Hard Disk Drive functions in this game.
- B: Turn OFF the game power. Unlock and open the front door. Inspect the CPU Board Assembly. Ensure that the Hard Disk Drive Assembly ribbon cable connector is fully seated into the mating connector on the CPU Board. Verify that all hard drive mounting screws are installed.

CAUTION: DO NOT REMOVE OR INSTALL ANY CONNECTOR WHEN POWER IS TURNED ON. THIS WILL DAMAGE THE CPU BOARD OR HARD DISK DRIVE AND VOID THE WARRANTY.

- C: Check that the Hard Disk Drive Assembly is the correct part for this game. Each Hard Disk Drive is labeled with the assembly number and the software version. Refer to Parts (Section Two).
- D: Verify that the ROM instruction set is correct for this game. There is more than one ROM in a game set. Each ROM circuit is labeled with the assembly number and the software version.
- E: Verify that the CPU Board Assembly is correct for this game. Each CPU Board is marked with the manufacturer name, assembly number and the hardware version.
- F: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Power connector pins. Verify the +5V source if it is adjustable. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information and voltage limits.
- G: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading indicates that the supply voltages are unstable and may contain ripple or noise.
- H: Compare CPU Board Light Emitting Diode states with the CPU Indicator Chart (Section Three).

3. Monitor will not lock onto the signal and provide a stable picture, colors are missing, etc.

- A: Check connectors and cables for wiring continuity from the CPU Board to the Video Monitor. Verify all jumpers are set correctly for this monitor. Refer to Board Configuration (Section Three).
- B: Ensure that the Video Monitor Assembly is correct for this game. Use of video monitors with different resolution will result in what appears to be horizontal tearing or complete loss of sync.
- C: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

4: Game operates normally, but video picture wavers or rolls, has dark bars, uneven colors, etc.

- A: Check connectors and cables for wiring continuity from the CPU Board to the Video Monitor.
- B: Ensure that all the cabinet ground wires are connected, especially at the Video Monitor Chassis.
- C: Move the cabinet farther away from machines, appliances, other games, etc. Very strong electrical or magnetic fields are emitted from some equipment when it is operating normally.
- D: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

MISCELLANEOUS

1: Marquee lamp is intermittant or non-functional. Game starts and plays normally.

- A: Open the cabinet marquee or attraction panel. Remove the lamp end locks and the fluorescent tube from the holders. Install a new lamp if cracks or darkened ends are found. Clean the tube.
- B: Verify that the lamp and starter pins are making good connection with their socket contacts.
- C: Measure the Fluorescent Lamp Assembly A.C. voltages (Power Wiring Diagram, Section Three). Check wiring and connector continuity from the A.C. Power Chassis to the Lamp Assembly.
- D: Ensure that the Fluorescent Lamp Ballast is rated for the local A.C. line voltage and frequency.
- E: Check for continuity of both fluorescent lamp filaments, the starter, and the ballast. One at a time, verify that the lamp, starter, and ballast operate by placing each in a known good unit.

2. Game operates normally, but fan is noticeably noisy.

- A: Check bottom and rear of cabinet for blocked air flow. Move game away from sources of heat.
- B: Turn OFF the game power. Apply high power vacuum cleaner to vent holes to remove dust.
- C: Open the cabinet to expose the electronics. Ensure that the fan is connected to wiring harness.

3. Error Messages appear on the screen. The game does not start and there is no audio.

- A: Check any assembly (RAM, ROM, Battery, etc.) identified in the Error Message.
- B: Call your authorized distributor for help with unresolved screen messages.

NOTES

WARNINGS & NOTICES

WARNING

USE OF NON-ATARI PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY ATARI AUTHORIZED PARTS.

* Substitute parts or modifications may void EMC directive or FCC type acceptance.

* For safety and reliability, substitute parts and modifications are not recommended. Use only ATARI authorized components and parts. Failure to do so will void warranty and may result in incorrect and/or unsafe operation.

* This game is protected by federal copyright, trademark and patent laws. Unauthorized modifications may be illegal under federal law. This also applies to ATARI logos, designs, publications and assemblies. Moreover, facsimiles of ATARI equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with ATARI components.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generated, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

When ATARI ships a game, it is in compliance with FCC regulations. Your label is proof. If the label is missing or damaged, legal repercussions to the owner or distributor of the game may result. If your game does not contain an FCC label, call ATARI immediately.

WARNING

Plug this game into a properly grounded outlet to prevent shock hazards and assure proper game operation. Do not use a cheater plug to defeat the power cord's grounding pin. Do not cut off the ground pin.

WARNING

A very small portion of the population has a condition which may cause them to experience epileptic seizures or have momentary loss of consciousness when viewing certain kinds of flashing lights or patterns that are present in our daily environment. These persons may experience seizures while watching some kinds of television pictures or playing certain video games. People who have not had any previous seizures may nonetheless have an undetected epileptic condition.

If you or anyone in your family has experienced symptoms linked to an epileptic condition (e.g. seizures or loss of awareness), immediately consult your physician before using any video games.

We recommend that parents observe their children while they play video games. If you or your child experience the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation, or convulsions, DISCONTINUE USE IMMEDIATELY and consult your physician.

NOTICE

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